WILD MEDICINAL PLANTS IN EGPYT

An Inventory to Support Conservation and Sustainable Use

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With contributions on
the phytochemical and pharmacological aspects by

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Illustrations from different sources, each is given in the text

WILD MEDICINAL PLANTS IN EGYPT

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FORWARD

Egypt supported one of the oldest civilizations of the world and has a long history of intense human occupation. Doubtless, the Egyptians throughout successive eras depended on plants for food, feed for their animals, fuel, fibres and folk medicine. Such a long and heavy impact on the plants has its effect on the plant diversity. Some of these plants were domesticated, while many others are still in the wild. Among the main groups, which are threatened, are the plants used as a source for phytotherapy. The famous Ebers Papyrus, written in 1550 B.C., gave 842 prescriptions that are not explicitly magical. They are made of 328 different ingredients, among which many plants are still growing in Egypt and the neighbouring countries.

The great surge of public interest in the use of the wild plants for medicinal, aromatic, cosmetic and culinary purposes has been going since times immemorial. The result is the loss of many plant species, which may be of economic and medical importance for the present and future generations. There is a great need for the conservation and sustainable use of these plants. However, there is no organized data and information about these plants to help implementing a strategy and action plan for their conservation.

The Academy of Scientific Research and Technology, represented by the National Committee for Conservation of Nature and Natural Resources and the IUCN (World Conservation Union) launched a series of activities. These include holding a workshop on the biodiversity of arid lands in N. Africa (Cairo November 14-16, 1995), and a programme for conservation of biodiversity. These activities were funded from the Swiss Development Co-operation (SDC). The programme in the first phase of the project constituted four issues. These themes included the conservation of wild medicinal plants, the biodiversity of the hot spots, education and biodiversity, and the conservation of the cheetah. The programme leader, Prof. K. H. Batanouny supervised and coordinated the activities of the project. Reports incorporating valuable data and information about biodiversity were among the outputs of the project. The reports on the medicinal plants represented a good base for preparing a book on these plants. The team engaged with the medicinal plants, headed by Prof. K. H. Batanouny, continued to co-operate in writing the present book.

The book on wild medicinal plants in Egypt provides a valuable source of information and data on these plants in the country. It is a good guide for researchers and planners in the field of medicinal plants and relevant subjects. The book contributes to understand the status of the wild medicinal plants in Egypt. It ensures the necessity of the sustainable and wise use of the wild medicinal plants. Professor K.H. Batanouny and his colleagues deserve our gratitude

and appreciation. Publishing this book by the Academy of Scientific Research and Technology and the IUCN, with the support of the SDC represents a good model of national and international co-operation and co-ordination in such an important field.

I am sure that the researchers and institutions in Egypt and abroad will appreciate this book. It will help in the furtherance of the conservation of a valuable component of the biodiversity.

Prof.Dr. Mofeed M. Shehab
Minister of High Education
and State Minister of Scientific Research, Egypt

PREFACE

The present work is the outcome of numerous efforts of many institutions and persons. Since 1956, I have been engaged with researches concerned with the wild medicinal plants in Egypt. The early co-operation with late Prof. Zakaria Fouad Ahmed, Professor of phytochemistry and his co-workers in the National Research Centre, and the colleagues from the Pharmacognosy Department, Faculty of Pharmacy, Cairo University was among the reasons of my ever-increasing interest in these plants. I have been a member of numerous Egyptian Committees on medicinal plants and their development. The outcome of the meetings of these committees is tremendous. Moreover, the traditional knowledge of the use of these plants in folk medicine and the Arabic (Islamic) scientific heritage in this field represent a very rich source of knowledge. All these and the excursions to the various parts of the desert in the Middle East and North Africa inspired me to write about the wild medicinal plants in Egypt and the other Arab countries.

As a president of the National Committe on the Conservation of Nature and Natural Resources in Egypt (IUCN National Committee), I, in co-operation with colleagues from the other North African Countries, initiated holding a workshop and the co-ordination of the IUCN (International Union for Conservation) and the support of the Swiss Development Co-operation (SDC) and the Academy of Scientific Research and Technology, of a workshop on "Arid Lands Biodiversity in North Africa" held in Cairo, November 14-16, 1994. The issue of the necessity of conservation of the wild medicinal plants was raised in the workshop. Through the help of the IUCN, a programme for biodiversity conservation was launched in the countries of North Africa. The medicinal plants, as an endangered component of biodiversity, received a special attention. A team of researchers in Egypt were co-operating in the investigation of the wild medicinal plants in Egypt. This team included three professors from the Department of Pharmacognosy, Faculty of Pharmacy, Cairo University who were co-operating in the IUCN project of the conservation of biodiversity. Reports as output of the project were presented to the IUCN, the National IUCN Committee, and discussed in meetings with other colleagues from the North African countries.

The data and information incorporated in the reports of the project on wild medicinal plants in Egypt represent a voluminous addition to the knowledge in the field of medicinal plants, especially the wild species which received a little attention as compared to the cultivated ones. Therefore, it has been thought that it can be very important to publish these data in the present book. More information and data were collated and added. Also, photographs and illustrations were included.

This book aims at giving a reasonable background to researchers in the fields of pharmacognosy, phytochemistry, ecology, botany and other related subjects. In view of the threatening of these plants due to the overexploitation, increasing demands on them, change of habitat conditions, there is a necessity to conserve these plants for sustainable use. Their conservation will help also the conservation of the traditional knowledge of the native healers. Moreover, the intellectual property rights are preserved for the country. This volume will not only allow researchers, decision makers and stakeholders to know about this important component of biodiversity and its problems in Egypt, but will also set forth action for its conservation and for its rational and sustainable utilization, in accordance with the principles outlined in the International Conventions.

Without the help and support of many institutions, persons, this book would not appear. Some of these passed leaving their impact on the field of wild medicinal plants. Others are still generously giving and supporting these studies. Doubtless indebted I am indebted to all those have given a hand or any support. The continuous support of the successive Presidents of the Academy of Scientific Research and Technology, (Prof. Ali Hubeish, Prof. Hamdy Morsy, and Prof. M. Yousry) made the appearance of this book a reality. To them I feel grateful for support. Thanks are due to the IUCN, especially Mr. Francis Parakatil, the Regional Co-ordinator for West and Central Asia and N. Africa, whose efforts were instrumental in providing effective networking throughout the region and supporting the implementation of the work. He has been continuously supporting the project as well as the other projects of biodiversity conservation in Egypt and the other North African countries. His help is greatly appreciated. It is evident that the financial support of the Swiss Development Co-operation has helped in the preparation of the reports for the project and the printing of the book.

Last, but not least, I would like to express my gratitude to my wife for her patience and support.

Cairo, January 30, 1999

K.H. BATANOUNY
President,
IUCN National Committe,
Egypt

CHAPTER ONE

PLANTS AND PHYTOMEDICINE

Plants as a therapeutic source

Plants have always played a major role in the treatment of human and animal diseases. Medicinal plants can be used in different forms: 1-as raw materials for extraction of active compounds or for extraction of abundant but inactive constituents which can be transformed by partial synthesis into active compounds. 2- as such, as extracts, or as traditional preparations.

Medicinal plants are a therapeutic resource much used by the traditional population of the world specifically for the health care (Plates 1 to 4). Worldwide interest in the use of medicinal and aromatic plants is increasing. Beneficial effects of plant-based medicines and other plant-based products are being rediscovered. Ethnobotanical information is leading to the discovery of novel phytopharmaceuticals and other phytoproducts. This trend has made their commercialization a necessity. Therefore, industries based on medicinal and aromatic plants have been established all over the world with a view to manufacture the so-called green products to satisfy the growing demand. Nevertheless, validation and utilization as a phytopharmaceutical product need much basic and applied research in order to put this resource on the same level as the patented pharmaceutical products so achieving acceptance by the medical system, and satisfying the requisite of safety, efficacy and quality.

The development of formulation of drugs of plant origin involves botanical identification of the vegetable drug, cultivation and post-harvest procedures, extraction procedures, standardization of extracts and pharmaceutical formulation. This means that the phytotherapeutics are in the hands of personnel from different disciplines. The production of phytotherapeutics or drugs from plants needs the co-operation of a big team of horticulturists, botanists, ecologists, taxonomists, phytochemists, pharmacists, pharmacologists, pharmaceutical specialists, marketing and distribution specialists, etc. The modern development of phytotherapy requires the integration of scientific results of different disciplines, namely, ethnobotanical, agrotechnical, biomedical, industrial, registration and marketing, and education and dissemination. Doubtless, this puts the issue of medicinal plants and phytotherapeutics in a critical situation as the synchronized co-operation among these specialists is not an easy task.

The plant products available in the commercial market still lack, to some

extent, quality certificates that inform us about the content of the active ingredients and need standardization procedure. Standardization is more difficult with drugs which active principles are not well known. No one is prepared to take plant products seriously unless certain elementary quality control criteria have been fulfilled. Also, physicians are not prepared to prescribe the raw plant drugs. A full acceptance of phytopharmaceuticals and the integration of phytotherapy into the concepts of classical medicine can be achieved only if phytopharmaceuticals meet the same criteria of quality as synthetic pharmaceuticals.

Adulterated phytopharmaceuticals have been put on the market in different countries. Moreover, we should be aware of the problems with contaminants like effect of pesticides.

The safety and quality of phytopharmaceuticals must be guaranteed, even if efficacy is already recognized and traditionally accepted

The development of medicinal and aromatic plants is hindered by lack of technical and economic data.

It is interesting to note that in many countries all over the world the drugs are exhibited in the shops in a more or less similar manner. The photos in Plate 2 show the exhibition of drugs in a store in Aswan (Egypt) and in Mendoza (Argentine). Trade in the drugs obtained from wild plants is very common everywhere (Plates 2 & 3). However, there is no proper attention paid to its socio-economical aspects in the developing countries.

The economic value of phytomedicines:

Soldati (1997) estimated the world-wide sales of over-the-counter phytomedicines to be $ 10 billion, with an annual growth of 6.5%. The US market for botanical medicine is estimated to exceed $ 2 billion at retail sales in 1997 (**Brevoot** 1997). Due to this demand, both universities and pharmaceutical companies devote themselves to the research of medicinal plants.

The European market for Herbal Medicinal Products (HMP) represents $7 billion of the $ 14 billion global retail market. Based on thousands of years of herbal tradition, business conditions in Europe are very favourable. There are well established guidelines and regulations to register HMP as drugs in many European countries. Germany is the leading market with approx. 50% of the sales in Europe, followed by France and Italy. In Germany still 50% of the HMP are prescribed by physicians and reimbursed by the health insurance system. Some multinational pharmaceutical companies like Boehringer Ingelheim, Bayer, Novartis and Roche are active in the field of HMP.

On the other hand, in developing countries, there are no reliable available data on the economy of the medicinal plants. The problem is more significant in the case of wild medicinal plants. However, these are the plants subjected to degradation and may be to extinction within a few years. In view of the consequences of

the GAAT, it is important to assess the value of these plants as an important biological resource and to document the intellectual property rights.

Conservation

Medicinal plants are an important health and economic component of the floras in developed as well as developing countries. Increasing world-wide interest in herbal remedies, expanding reliance of local health care of traditional remedies, and a renewed interest in the development of pharmaceuticals from plant sources have greatly increased trade in medicinal plant materials. Important populations of medicinal plants are found not only in the regions and ecosystems with high biological diversity but also in less diverse floras and in floristic communities that are not a common focus of conservation efforts. For instance, in the arid and semi-arid zones of the Middle East, the floras comprise very important genetic resources of crop and medicinal plants. The conservation of medicinal plant species in the wild is indispensable.

While little is known about the population status of the majority of medicinal plant species, it is clear that most medicinal plants are collected from wild populations, and many are seriously threatened with extinction by lack of local harvest controls and habitat degradation. The current focus of attention on biodiversity prospecting has diverted attention from the more serious environmental threat posed by large-scale harvest of medicinal plants for phytomedicine production. Efforts to comprehend conservation needs and provide incentives for long-term sustainable harvest of medicinal plants are few. National and international regulation and protection may have some effect, but the most important role and responsibility for sustainable use belongs to industry and consumer support for local conservation.

The great surge of public interest in the use of plants as medicines is based on the assumption that the plants will be available on a continuing basis. However, no concerted effort has been made to ensure this, in the face of threats posed by increasing demand of vastly increasing human population and extensive destruction of plant rich habitats.

The disappearance of the medicinal plants from their natural habitats has an unseen consequence. This is the knowledge of the medicinal healers. In some parts of Egypt, as well as other Arab countries, this healer is known as a "doctor" or *hakim*. Those traditional doctors usually have a long and inherited experience. The erosion of such important genetic resources and their deterioration are accompanied with the disappearance of knowledge and traditional experience. Consequently, a loss of valuable intellectual property rights.

There is a great need to provide a framework for the conservation and sustainable use of plants in medicine. Ethnobotanical studies should be encouraged which represent basic studies to help implementing conservation programmes.

Drugs obtained from these plants are sold in the market, they are sold either fresh or dried (Plates 2 & 3). Shops selling these drugs, either fresh or dried, are found in the old part of the cities in the Arab region, and also in the Islamic countries. These shops are full of drugs obtained from the same country or imported from different countries. All over the Arab, and also the Islamic World, one finds that these shops are in the old part of the city. These shops occur in narrow lanes and are full of drugs. The continuous use of these plants impose a considerable pressure on the naturally growing plants in the deserts and semi-deserts of the region. In such habitats, the rate of exploitation is more than the rate of establishment of new stands of the collected plants. Doubtless, this has consequences affecting the components of the environment, including the biodiversity.

Agriculture of medicinal plants:

The production of medicinal and aromatic plants requires an understanding of plant growth, ecology, business, economics, law, conservation, and a lot of other subjects related to tillage and gathering plants. While developments such as machinery, fertilizers, and pesticides, have helped farmers meet demands for quality materials at affordable prices, the balance with farming costs, and labour compels society to set directions and establish limits. The technology of producing plants continues to evolve with the movement of laboratory and field experiments to firms and forests with the expectation that advancements create better farming. The current task is to examine and measure farming methods according to established principles in accordance with the common needs of communities. By taking advantage of progress in biology, engineering, and other disciplines, medicinal and aromatic plant growers can undoubtedly continue to harvest high-yielding crops.

Use of wild desert plants and their cultivation is not a new practice. It has been common in many countries all over the world. In U.S.A., Mexico, India and many other countries, such plants have been cultivated over wide areas and produced considerable economic return.

The wild medicinal plants growing in the desert region of Egypt can be a good source for cultivating vast areas in the desert with the least ecological consequences in addition to the conservation of such resource. The advantages and benefits of the cultivation of wild medicinal plants as given by Batanouny (1994a) include:

1- Conservation of water

- Desert plants have low water consumption. The wild medicinal plants, as other desert ones, are endowed with characteristics and adaptations making them drought resistant and/or drought tolerant.
- One can make use of seepage water along the margins of the farms and irrigation canals. The yield can be a reasonable cash crop for the farmers in the desert.
- The wild plants are able to tolerate the unavailability of continuous exogenous water supply for reasonable periods.

2- Sustainable development

- Cultivation of wild plants do not introduce new weeds or other new pests to the ecosystem.
- Many wild plants do not need the use of pesticides. This is a privilege of plants cultivated under desert conditions, i.e. under almost their natural habitat conditions.
- Minimal ecological consequences for the agro-ecosystem
- Minimal degradation, salinization, soil erosion, waterlogging, etc.

3- Improvement of the economy of wasteland

4- Environmental protection

- Dune stabilization
- Wildlife habitat
- Biodiversity conservation

5- Economical improvement

- Fill a gap in the domestic needs such as folk medicine and pharmaceutical industries.
- Potential for exports, especially pharmacoepial drug plants
- Potential for creation of small industries in cutting, drying, grinding, extraction, packing, etc..
- Provides cash (crop) income for settlers in newly reclaimed land and desert areas.

Historical Review

As early as 3000 B.C., the ancient Egyptians put much confidence in plants for curing many diseases. Up till now, the same confidence is still existing among the contemporary Egyptians and a "turn-back" to "remedy by herbs" is now becoming a global rather than regional or national request. This is strongly favoured, since the natural drugs have little or no side effects as do the chemically synthesized medications.

In view of the diversity of the habitats and the climate of the country, the biota exhibits considerable diversity. The plant resources, despite the climatic aridity, are diverse and some of them could be unexpected food or remedy for the natives. The medicinal plants growing in the various habitats in Egypt represent a major and important component of these plants, which are threatened and some are on the brink of extinction. The present study covers a historical review of the knowledge of medicinal plants in Egypt as well as the neighbouring countries.

Since times immemorial, the use of plants for curing human diseases has been in practice everywhere. Such use of plants is a part of the human history in Egypt as well as in all the countries of N. Africa and the Middle East.. The people in the region depended mainly on traditional medicine for their health care needs and the ailments of their animals. The folk medicine in the region is full of recipes for curing various diseases. The term "*Attar*" in Egypt and "Herb's seller" in Tunisia denotes the persons who sell drugs and medicinal plants for curing diseases or for health care. The shops of *attarin* occur in the narrow lanes of the old part of the city in any Arab country. It is the quarter of the city, which represented the core of the old city, with mosques. The drugs and the medicinal plants, from every corner of the world, are exhibited in a very attractive way (Plates 2 & 3). The beautiful colours are attractive, and the odour is characteristic of the whole quarter. One smells cumin, cardamom, coriander, cinnamon, pepper, liquorice, etc.; all mixed together with perfumes. This is not in a particular city, but it observed in all the cities of the Arab World. The photos given in Plates 2 and 3 represent show the exhibited drugs and the diseases which they cure. It is noteworthy that this is also the case in many other countries all over the world. For instance, in Argentine (Plate 2), One can see the same exhibition in the city of Mendoza

In Egypt, the famous Ebers Papyrus, written in 1550 B.C., gives 842 prescriptions, that are not explicitly magical, they are made of 328 different ingredients. Among them are plant species growing in Egypt or other N. African countries, e.g. *Artemisia absinthium, Acacia spp., Balanites aegyptiaca, Bryonia spp., Hyoscyamus muticus, Myrtus communis, Onopordon spp., Ziziphus spp.*, etc.

Dioscorides, in his ***Materia Medica***, gave the names of many plants from Egypt (*Acacia nilotica*, the Egyptian thorn) and Cyrenaica (*Dorema ammoniacum*). The "***Materia Medica***" was translated to Arabic in the IXth century A.D. by **Stephan son of Basil**. However, improved translations were done later.

The Muslim herbalists wrote over centuries many books and treatises on medicinal plants in the Islamic World, including Egypt. In view of the vast area occupied by the Islamic nation, the names of these plants were given in Arabic, Amazighy (Berber), Greek, Persian, Hindi and other languages. In the present book, we are not going to give a detailed study of the history of writings on medicinal plants of the Moslem World. However, we shall concentrate on the scholars and writings more or less related to the medicinal plants in North Africa, and specially Egypt.

Abu Bakr Mohammed b. Zakariya ar-Razi (d. about 313 Hj, 925 A.D.), known in Europe mostly under the latinized name of Rhazes. *Rhazya* spp. were called after him, e.g. *Rhazya stricta*, (in Arabic *harmal;* one should distinguish between the *harmal*: *Peganum harmala* and the *harmal* for *Rhazya* in the countries of Arabia). He was a Persian Muslim, who produced a most incredible number of works on medicine, natural sciences, logic, metaphysics, mathematics, alchemy, theology and ethics. Among them is the bulky work "***Continens***" (***al Hawi fi'Tibb***) in 20 volumes on therapeutics. It has been the main source for writings in this field for centuries.

One of these Muslim Scholars who was born and lived in North Africa is **Ibn El Jazzar al-Quairawani** (died 389 Hj, 1005 A.D.) who wrote many books; one of them about simple drugs. This book includes 272 drugs, mainly of plant origin, and has been translated to Greek, Latin and Hebrew.

Among the famous Muslim physicians and philosophers is **Ibn Sina (Abu Ali al-Husain b. Abdallah** (d. 428 Hj, 1036 A.D.), known in Europe as Avicenna (the name of the genus *Avicennia* was given after him). He wrote hundreds of books and treatises His book the "***Canon of Medicine***" (***al-Qanun fit'Tibb***) contains a section on simple drugs. This is frequently quoted by many writers after **Ibn Sina**. The book was translated to Latin, e.g. the Latin edition "***Abuali ibn Tsina (Avicenna) Canon Medicinae***" ***interprete et scholiaste*** **V.F. Plempio.** Lovain 1658 (Fig. 1).

Abu Ga'far Ahmed b. Mohammed al-Ghafiqi (d. about 1160 A.D.) wrote **"Book of Simple Drugs"**. **Meyerhof** and **Sobhi** (1932) wrote about this book :"is not equalled in excellence or in sense". **Al-Ghafiqi** abridged the writings of **Dioscorides** and the great **Galenos** in succinct language yet (preserving nevertheless) their full meaning. After their text, he mentioned all that was new in the sayings of later scholars concerning simple drugs, and what everyone of them had collected and known afterwards. This book became a collection of the sayings of those who excelled in (the knowledge of) simple drugs, and an

encyclopaedia to which one had to refer in case of necessity for verification. **Gregorius, Abul-Farag Ibn al-Ibri** (Son of the Hebrew), latinized Barhebraeus (d. 1286 A.D.) wrote an abridged version of the "***Book of Simple Drugs***" of **Al-Ghafiqi**. **Meyerhof** and **Sobhy** published parts of this book with excellent commentaries in 5 volumes from 1932 to 1940 as publications of the Faculty of Medicine, the Egyptian University.

Abul-Abbas an- Nabati, Ibn al-Rumiya (d. 637 Hj. 1239 A.D.) who had been given the title (Botanist), made an excursion in N. Africa, the Levant and Iraq. After his return to Seville in Andalusia, he established a pharmacy for selling drugs and wrote a book entitled : ***Botanical Journey***.

Another famous Muslim Scholar in N. Africa is **Ibn al-Beitar (Diya' ad-Din Abu Mohamed Abdallah bin Ahmed bin al-Beitar** (died 646 Hj., 1248 A.D.) who wrote the well-known monumental work "***Gamie Al Adwiyah wal-Aghzia***" which has been translated to Latin (in 1758) and other languages. He made an expedition in N. Africa, the Levant and Asia Minor. **Ibn al-Beitar** described 1400 drugs, including 300 not mentioned by **Dioscorides** and other herbalists before **Ibn el-Beitar**. It is interesting to mention that he gave the names of the plants in different languages, its description, habitat and geographical distribution. **Leclerc** in his "Histoire de la Medicine Arabe" called him "the greatest botanist of the East".

Abu'l-Muna Dawud b. Abi Nasr known as **Kohen Al Attar** (d. 658 Hj, 1259 A.D.) lived in Cairo in the XIIIth century A.D. and composed in 1295 a book on the composition of remedies divided into 25 chapters. This book ***Minhag Ad-Dukkan*** (i.e. the ***Management of the Shop***) had a wide-spread reputation and is still used by all the native bazaar druggist of the Middle East. It survived in many MSS and was printed five times since 1287 A.H. (1870 A.D.) in Cairo alone.

A famous scholar is **Dawud b. Umar al-Antaki** (d.1008 Hj, 1599 A.D.), who lived in Cairo and left an alphabetical list of drugs and medical terms known as ***Tadkirat Uli al-Albab*** "***Memorandum for Intelligent People***". It was printed for the first time in Cairo in 1254 A.H. (1838 A. D.), and then numerous times since. It is in favour with the oriental druggists. It is used till now by the contemporary druggists in Egypt and the other Arab countries.

A Muslim Andalusian Scholar, **Al-Ghassani** (d. 1019 Hj., 1611 A.D.) innovated a system for the classification of the plants. He described in his book about 380 drugs, mainly of plant origin. He described the plants, their habitats and differentiated between annual and perennial herbs. He introduced diagnostic characteristics of the different plants of the various families.

In modern ages, publishing the manuscripts of these scholars and others took place. Writing about medicinal plants became very common. Institutes, universities and research centres hosted many studies on the medicinal plants of the different countries in Egypt and other countries in the Middle East and North

Africa. Phytochemical screening and search for active principles in wild plants represent common projects in the different countries. Ecological, taxonomic and floristic studies of medicinal plants took place.

In 1960 a book on the medicinal plants in arid zones was published by UNESCO (**UNESCO** 1960). Both the botanical and pharmacological aspects of medicinal plants growing in the arid zones were presented in that book Later, in 1983, **Boulos** wrote a book on the medicinal plants in North Africa in which he gives information about these plants and their therapeutic uses in folk medicine. Scientists from the region wrote many books and articles about the medicinal plants (*cf.* **Batanouny** 1989, 1994b).

Nevertheless, there are gaps of knowledge about the medicinal plants in Egypt, e.g., their autecology, distribution, productivity, possibility of cultivation. In view of the rapid extensive exploitation of the wild medicinal plants, it is indispensable to undertake studies on these plants and investigate methods and measures of conservation.

CLARISSIMI ET PRÆCELLENTISSIMI

DOCTORIS

ABVALI IBN TSINA

Qui hactenus perperàm dictus est

AVICENNA

CANON MEDICINÆ

Interprete & Scholiaste

VOPISCO FORTVNATO

PLEMPIO

TOM. I.

Librum primum & secundum Canonis exhibens, atque ex libro quarto tractatum de Febribus.



LOVANII,

Typis ac Sumptibus HIERONYMI NEMPÆI, ANNO 1658.

CUM GRATIA ET PRIVILEGIO

Fig. 1. Cover page of the Latin edition of "Abuali ibn Tsina" (Avicenna) Canon Medicinae, 1658.

Wild Medicinal Plants in Egypt

The conspicuous habitat diversity in the country, as a result of geographical, physiographic, edaphic and climatic conditions, is reflected upon the plant life. More than two thousand species grow wild in Egypt. Doubtless, man has been using hundreds of these species for their therapeutic value or as condiments.

The list of medicinal plants in Egypt and the Arab countries is inexhaustible (*cf.* **Batanouny** 1983). There is no complete inventory of medicinal plants of the region.. In the present study, the pharmacopoeial medicinal plants will be studied separately. Then, we shall deal with the common plants used in folk medicine. Some plants which have been studied for their content of active principle and found to be of potential medicinal value will be included in the present study.

Table 1- **Total Plant Species, Endemic and Threatened Species in Egypt.**

Country	Total Number	Endemic Species	Threatened Species
Egypt	2076	70 (61)	98

Source: World Resources 1994-95. *Recent studies

A- Pharmacopoeial Wild Medicinal Plants

These are plants used in folk medicine since a long time ago. Recent and modern studies on these plants proved the occurrence of active principles in them. Their pharmacological activity had been investigated. They are among the pharmacopoeial drugs in different pharmacopoeias; either in the Arab countries or abroad.

B- Plants Used in Folk Medicine :

There are numerous plant species which are collected from the field to be sold in the "*Attarin*" or the herb's seller shops.

C- Plants of Potential Medicinal Value:

Many plant species were investigated for their active constituents. This has been done depending on the information of the folk use of these plants, or in species with relatives of species, genera or the same family, known from other countries to have active constituents. These activities began with the establishment of the

Egyptian University, especially the School of Medicine. The establishment of the National Research Centre in the mid-fifties and the units of medicinal plants and pharmacognosy was the prominent start in the study of the wild plants, especially the desert ones. The activities of this unit represent a milestone in the phytochemical studies of wild plants. The senior author (**K. H. Batanouny**) was lucky to be in intimate scientific relation with the head of this unit Late Prof. **Zakariya F. Ahmed** and his co-workers since the mid-fifties. The continuous collaboration with the scientific school of Professor **Ahmed** produced a tremendous number of publications by his co-workers covering the investigation of many desert plant species. These studies were either dealing with phytochemical screening of these plants, or mainly the separation of the active constituents of these plants and their pharmacological test. Innumerable number of active principles were separated and investigated. Also, the units of natural products in the National Research Centre and the departments of Pharmacognosy at the Faculties of Pharmacy, and Chemistry and Botany at the Faculties of Science in the Egyptian Universities contributed a lot to our knowledge about the wild medicinal plants. Meagre trials were done to compile these studies. It seems indispensable to have, at least an annotated bibliography of the literature dealing with the Egyptian wild plants. Studies on the cultivation and domestication of wild medicinal plants are still fragmentary. Such studies were conducted mainly on the traditional cultivated medicinal and aromatic plants. This shows the great need for such investigations.

Examples of plants reported for their content of active principles, one mentions : *Ajuga iva* (L.) Schreb., *Alhagi graecorum* Boiss., *Anabasis articulata* (Forssk.) Moq., *Anthemis cotula* L., *Argemone mexicana* L., *Artemisia monosperma* Delile, *Brassica tournefortii* Gouan, *Calendula arvensis* L., *Centaurea calcitrapa* L., C. *glomerata* Vahl, *Chenopodium ambrosioides* L., *Cucumis prophetarum* L., *Cynomorium coccineum* L., *Dipcadi erythraeum* Webb & Berthel., *Diplotaxis harra* (Forssk.) Boiss., *Eminium spiculatum* (Blaume) Schott, *Ephedra alata* Decne., *E.aphylla* Forssk. (=*E.alte* C.A. Mey.), *Euphorbia* spp., *Fagonia* spp., *Farsetia aegyptia* Turra, *Ferula* spp., *Gnaphalium luteo-album* L., *Gypsophila capillari*s (Forssk.) C.Chr., *Haloxylon salicornicum* (Moq.) Bunge ex Boiss., *Hyoscyamus albus* L., *Hypecoum pendulum* L., H. *procumbens* L., *Jatropha glauca* Vahl, *Lactuca* spp., *Lavandula coronopifolia* Poir., *Lotus arabicus* L., *Marrubium alysson* L., *Melilotus* spp., *Nicotiana glauca* Graham, *Nitraria retusa* (Forssk.) Asch., *Onopordon alexandrinum* Boiss., *Pancratium* spp., *Physalis angulata* L., *Polygonum equisetiforme* Sm., *Retama raetam* (Forssk.) Webb & Berthel., *Rumex* spp., *Scorzonera* spp., *Senecio* spp., *Sinapis arvensis* L., *Solanum* spp., *Sonchus* spp., *Thesium humile* Vahl, *Vaccaria hispanica* (Mill.) Rauschert, *Varthemia candicans* (Delile)Boiss., *V. montana* (Vahl) Boiss., *Verbascum* spp., *Withania somnifera* (L.) Dunal, *Zilla spinosa* (L.) Prantl, and *Zygophyllum* spp.

Phytogeographical Regions in Egypt:

Muschler (1912) wrote : "In citing the several localities for each species, it has appeared expedient to arrange them under five phytogeographical regions, into which the large area embraced by the flora has been divided". He used the division adopted by **Ascherson and Schweinfurth** (1887) in which they divided the country into five phytogeographical regions. These are: Mediterranean region, Nile-Delta region, Oases of the Libyan desert, Desert region, and the Red Sea region. Later, two regions were added, namely Sinai and Gebel Elba (**Täckholm**, 1974).

The phytogeographical regions (Fig. 2) of the country are:

N: The Nile region including the Delta, valley and Faiyum
- **Nd** The Nile Delta, including Cairo, but not further south
- **Nv** The Nile Valley, from Cairo to Wadi Halfa
- **Nf** The Nile Faiyum

O: The oases of the Western Desert: Wadi Natrun, Siwa, Farafra, Bahariya, Kharga, Dakhla, Kurkur, Dungul and Uweinat.

M: The Mediterranean coastal strip from the border with Libya near El Sallum to the borders with Palestine at Rafah
- **Mma** The Western Mediterranean coastal region , ma stands for Marmarica.
- **Mp** The Eastern Mediterranean coastal region , p stands for Pelusiac-Tanitic branches of the Nile.

D: All the deserts of Egypt except that of Sinai
- **Da** The Arabian Desert east of the Nile
  - **Da sept.** The part of the Arabian desert from Wadi Tumilat to Qena-Quosseir road (sept. stands for septentrionale, North)
  - **Da mer** The part of the Arabian desert from Qena-Quosseir road southwards (mer stands for meridionale, South).
- **Di** The Isthmic desert, i.e. El-Tih desert and the region north of wadi Tumilat
- **Dl** The western desert, Libyan desert, west of the Nile.

GE Gebel Elba and surrounding mountains, situated in the south-eastern corner of Egypt at the Sudan Frontier.

R Red Sea coastal region

S Sinai proper, i.e. South of El Tih Desert

Table 1- Distribution of the Wild Pharmacoeupial Medicinal Plants in the Different Phytogeographial Regions in Egypt

Species	Phytogeographical region
1. ***Ammi visnaga*** (L.) Lam.	M, Mp
2. ***Ammi majus*** L.	N, O, Mp
3. ***Citrullus colocynthis*** (L.) Schrad.	D, O, N, M, R, GE, S
4. ***Datura stramonium*** L.	N, Mma
5. ***Glycyrrhiza glabra*** L.	O
6. ***Hyoscyamus muticus*** L.	N, O, M, D, R
7. ***Plantago afra*** L.	Mp, Da, Di, R, GE, S
8. ***Plantago lanceolata*** L.	Nd (Cairo-Inshas Road)
9. ***Plantago ovata*** Forssk.	Nd, M, Di, Da sept, D1, S
10. ***Senna alexandrina*** Mill.	Nv, Da mer, R, GE, S
11. ***Senna italica*** Mill.	Nv, O, Da, D1, GE, S
12. ***Silybum marianum*** (L.) Gaertn.	N, O, Mma, Di, (canal banks)
13. ***Urginea maritima*** (L.) Baker.	Mma (Sidi Barrani), Mp, Di

Table 2- Distribution of the wild medicinal plants used in the folk medicine in the different phytogeographical regions of Egypt

Species	Phytogeographical region
1. ***Acacia nilotica*** (L.) Delile	N, O, D, R, GE, S
2. ***Achillea fragrantissima*** (Forssk.) Sch.Bip.	O (Kharga), Mp, Di, Da.sept, Dl, R, S
3. ***Adiantum capillus-veneris*** L.	N, O, M, Da, R, GE
4. ***Adonis dentata*** Del.	M, Di, D1
5. ***Ambrosia maritima*** L.	Nd, Nv, O, M (muddy canal banks)
6. ***Anastatica hierochuntica*** L.	O (Uweinat), D, R, S
7. ***Anchusa hispida*** Forssk.	Mma

8. ***Artemisia judaica*** L.	Mma, Da, Dl, R, GE, S
9. ***Balanites aegyptiaca*** (L.) Delile	Nv, O, Da.mer, Dl, GE
10. ***Bryonia cretica***	L. Mma
11. ***Calotropis procera*** (Aiton) W.T. Aiton	Nf, Nv, O, Da, Dl, R, GE, S
12. ***Capparis spinosa*** L.	O, D, S
13. ***Centaurea pumilio*** L.	Mma, maritime sand
14. ***Centaureum pulchellum*** (Swartz)	Druce N, O, M, Di, S
15. ***Centaureum spicatum*** (L.) Fritsch	N, O, M, Di, S
16. ***Cleome droserifolia*** (Forssk.) Delile	O (G.Uweinat), D, R, GE, S
17. ***Colchicum ritchii*** R.Br.	M, Di, Dl, S
18. ***Commiphora opobalsamum*** (L.)Engl	GE
19. ***Cymbopogon proximus*** (Hochst.) Stpf	Da.mer, GE
20. ***Cyperus rotundus*** L.	N, O, M, D, R, GE, S
21. ***Juniperus phoenicea*** L.	Di, very rare
22. ***Moringa peregrina*** (Forssk.) Fiori	Da, R, GE, S, rocky crevices
23. ***Origanum syriacum*** L.	Di, Da.sept, S
24. ***Peganum harmala*** L.	M, Di, Da.sept, S
25. ***Pluchea dioscorides*** (L.) DC	N, O, M, Da.sept, S
26. ***Posidonia oceanica*** (L.) Delile	Mma
27. ***Primula boveans*** Duby	S, endemic
28. ***Rumex vesicarius*** L.	Mma, Da, R, GE, S
29. ***Solenostemma arghel*** (Delile) Hayne	Di, Da, S
30. ***Salvadora persica*** L.	Nv, O, Da, R, GE, S
31. ***Solanum nigrum*** L.	N, O, M, D, R, GE, S
32. ***Thymus bovei*** Benth	Di,Da.sept.
33. ***Thymus capitatus*** (L.)	LinkMma, rocky habitats
34. ***Teucrium polium*** L.	Mma, Di, Da.sept, Dl, S
35. ***Tribulus terrestris*** L.	N, M, D,R, S, GE
36. ***Urtica pilulifera*** L.	M, Nd, weed
37. ***Urtica urens*** L.	N, M, Di, Da.sept, weed
38. ***Ziziphus spina-christi*** (L.) Willd.	N, O, M, R, GE, S
39. ***Zygophyllum coccineum*** L.	Da, R, Di

The great surge of public interest in the use of plants, as well as some animal products, as medicines is based on the assumption that the plants will be available on a continuing basis. However, no concerted effort has been made to ensure this, in the face of the threats posed by increasing demand of vastly increasing human population and extensive destruction of plant-rich habitats.

Drugs obtained from these plants are sold in the markets all over the region. Shops selling these drugs, either fresh or dried, are widespread in the main cities of the country. Usually, these shops are found in the old part of the city (Figs. 3, 4, 5, and 6). All over the Arab, and also the Islamic World, one finds that these shops are in the old part of the city. These shops occur in narrow lanes and are full of drugs obtained from the same country or imported from different countries. The fragrant odours of the powders of the drugs and condiments can be smelled in the area where these shops are located. The visitors to these shops are diverse, with different educational backgrounds; everybody is asking the help of the *attar* and his advice for the treatment of some diseases, or for fattening or reducing weight. After birth, the woman needs nutritive drinks, which can be obtained by decoctions from compound drugs and materials mixed by the *attar*. The most famous prescriptions by the *attar* include those drugs for cough, urinary stones, abdominal pains, diabetes, rheumatism, spasms, aphrodisiac, constipation, headache, liver problems, skin diseases, ...etc. The continuous use of these plants impose a considerable pressure on the naturally growing plants in the deserts and semi-deserts of the region. In such habitats, the rate of exploitation is more than the rate of establishment in the harsh desert environment.

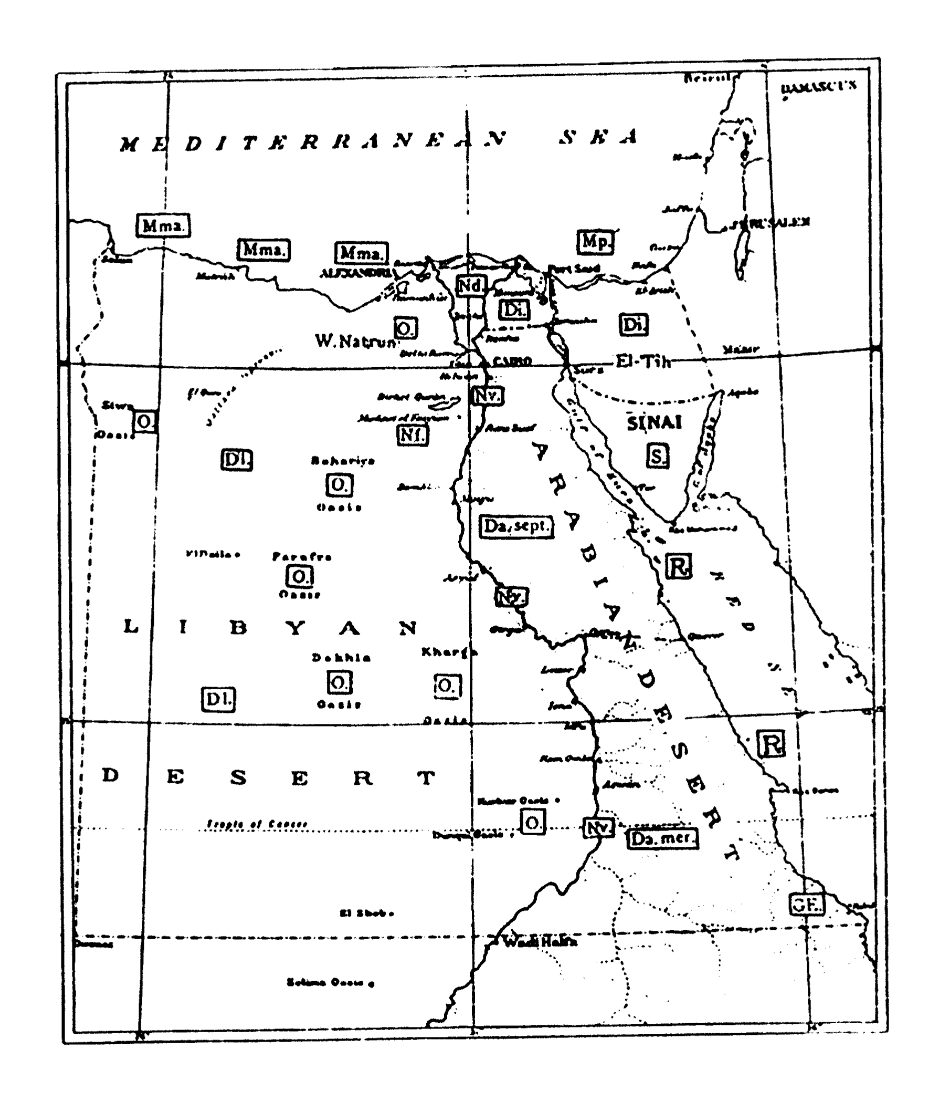


Fig. 2. Map of Egypt showing the phytogeographical terrains in the country (After: Täckholm, 1974).

Pharmacopoeial Wild Medicinal Plants in Egypt

The pharmacopoeial plants have been used since a long time in folk medicine. Some of them have been reported in the Ebers Papyrus. Almost all these plants have been mentioned in numerous books and treatises written by many scholars since the Greek writings of Dioscorides and all over the last fifteen centuries during the Islamic Era. Recent and modern studies on these plants proved the occurrence of active principles in the different organs of them. Their pharmacological activity has been investigated. In view of their importance as a source of extracts and active constituents used in medicine, they were embodied in different pharmacopoeias, either in Egypt and/or abroad.

The collection of these plants from their natural habitats threatens them to a great measure. No means have been taken up till now to conserve these wild plants. In view of the rising demands for these plants and the limited amount of the wild supply, it is indispensable to undertake measures for their conservation for the sake of sustainable use. However, it seems difficult to think of conservation without good knowledge of these plants. The present work is an attempt to give a multidisciplinary study on these plants covering their taxonomy, ecology, phytochemistry, pharmacology...etc. The wild pharmacopoeial plant species include: *Ammi majus, A. visnaga, Citrullus colocynthis, Datura stramonium, Glycyrrhiza glabra, Hyoscyamus muticus, Plantago afra, P. lanceolata, P. ovata, Senna alexandrina, Senna italica, Silybum marianum,* and *Urginea maritima.*

The above-mentioned plant species are used also in the folk medicine. Prescriptions from the *attar,* incorporating parts of these plants (seeds, fruits, leaves, stems, rhizomes or roots) are usually available in the local market in Egypt and many other countries.

Due to the lack of adequate information about the potentiality of cultivatring some of these plants, the pharmaceutical companies import some of these drugs. For instance, *Ammi visnaga* and *A.majus* could be easily grown in Egypt. However, the Egyptian companies import their fruits, may be from Morocco. This shows that the issue of the wild medicinal plants in Egypt should be clarified and to be well-investigated from different aspects, e.g. from the agricultural, commercial and marketing point of views. Such studies are indispensable. They will open the door for investigating other plant species, which would be of pharmaceutical importance to the country in the future.

Criteria studied for the wild pharmacopoeial medicinal plants

Names :

The legitimate Latin binomial, and its synonyms

Mention of the synonyms facilitates the search for the plant in the literature and abstracts under different names given to the plant.

Names in different languages whenever possible:

Arabic, Berber, English, French, German, Italian, and Turkish

Morphological Description

Ecology :

Habitat conditions

Distribution : Local - Regional - Global

Regional distribution : means the occurrence in North African countries, Egypt, Libya, Tunisia, Algeria and Morocco.

Status : To show if the plant is endangered, vulnerable or does not need conservation

Parts used: Names - Description

Constituents

Folk Medical Uses

Pharmacological Actions and Indications

Adulterants and Substitutes

Authentication - Tests for Purity

Pharmacopoeias

Phytopharmaceuticals in the Egyptian Market

Economic Potential, whenever data available

Cultivation, whenever data available.

References

Illustrations and/or photos

1- **Ammi majus L.** Sp. P1. ed. 1, 246 (1753)

Apium ammi Crantz, Strip. Austr 3: 109 (1767)

Arabic : *Khillah* خلة

Killah shaytani خلة شيطانى

Berber : Athrilal, Thalilen, Lattilel, Akhella.
English : Bishop's weed.
French : Ammi commun.
German : Ammei, Grosser Ammei.

Morphological Description:
An annual slender herb with pinnately-divided leaves into oblong acutely serrulate leaflets. Umbels, with small white flowers. The number of rays is much less than in *A. visnaga*, also not frutescent. Fruit, small, oblong, prominently ribbed (Plate 5).

Ecology:
The plant grows as a weed in the fields of winter crop cereals, as wheat and barley. It is a bad weed in these fields and affect their yield.

Distribution:
Local : Fields of winter crops in the Nile Delta and Valley, also in the Oases and the Mediterranean region.
Regional : North Africa; all over the countries of the region.
Global : Middle East, Europe and North Africa.

Status:
The plant is fairly common in the Delta and Nile Valley fields. However, its cultivation is necessary in order to obtain an adequate yield for the pharmaceutical industry. Its cultivation should be performed in the newly reclaimed land. There is fear of its invasion to the field in the successive seasons. The plant is an annual winter weed growing mainly in the wheat and barley fields. Sometimes, it is a menace. Its presence in the cultivated fields is not desirable. However, due to its importance in the pharmaceutical industries, it has been cultivated. Due to the drastic fluctuation of the prices of the fruits, the farmers are not willing to cultivate it. The companies using the drug may contract with some farmers to cultivate a definite area. Generally, these companies import *Ammi* fruits from Morocco.

Part Used:

The fruit known as *Ammi majus* fruit.

Description:

Odour, slightly aromatic, terbenthinate; taste, strongly pungent and slightly bitter.

Macroscopical: Fruit, **cremocarp**, nearly cylindrical, usually separated into its 2 mericarps, rarely entire, with a part of the pedicel attached. **Mericarp**, small, slightly concave on the commissural side. It is slightly tapering towards the apex; about 2 to 2.5 mm long and about 0.75 mm broad; crowned with a nectary disc-like stylopod; reddish-brown to greenish-brown; externally, glabrous, rough, marked with 5 broad, distinct, yellowish-brown primary ridges, alternating with 4 equally prominent dark brown secondary ridges; internally the mericarp shows a pericarp with 6 vittae, 4 in the dorsal and 2 in commisural side, a large orthospermous endosperm in which is embedded a small apical embryo. **Carpophore**, forked, each branch of which enters at the apex of the mericarp and unites with the raphe.

Microscopical: **Epidermis** of pericarp consists of polygonal cells, with straight anticlinal walls and short papillae, containing clusters or prismatic crystals of calcium oxalate, and covered with thick strongly striated cuticle; stomata, occasional, of cruciferous type, but no hairs. **Mesocarp**, formed of somewhat brownish parenchyma; traversed longitudinally by 6 large schizogenous vittae, 4 in the dorsal and 2 in the commissural side, appearing elliptical in transverse section, and each surrounded by large, radiating cells; and traversed in the primary ridges by vascular bundles, appearing oval, ovoid or rounded in transverse section, not accompanied by vittae (Distinction from *khella, Ammi visnaga* Lam.), each bundle, with a xylem strand and 2 lateral phloem strands and accompanied by strongly lignified fibres and reticulate, lignified cells; innermost layer of mesocarp, with large, polygonal, brown-walled equally thickened nonporous cells (Distinction from *Khella, Ammi visnaga*). **Endocarp**, of narrow, tangentially elongated cells, many of which being regularly arranged in groups, variously oriented, and adhering to the brown testa which is formed of similar,but wider, and somewhat shorter cells. **Endosperm**, of polygonal, somewhat thick-walled, cellulosic parenchyma with much fixed oil and several aleurone grains, about 4 to 12 microns in diameter, each with one or 2 rounded globoids and 1 or rarely 2 micro-rosette crystals of calcium oxalate, 2 to 4 microns in diameter. **Carpophore**, each branch traversed by a vascular strand of fibres and spiral vessels.

Constituents:
Coumarins and coumarin glycosides. The fruit yields not less than 0.5% of ammoidin (xanthotoxin), 0.3 % of ammidin (imperatorin), and 0.01 % of majudin (bergapten). Furanocoumarins have also been produced by cell suspension cultures of *A.majus*.

Tests for Identity :

A. Boil about 0.05 g of *Ammi majus* fruit with 5 ml of water for 1 minute and strain; add 1 or 2 drops of this decoction to 1 ml of a solution (1 in 1) of sodium hydroxide R; no rose -red colour is produced (Distinction from *khella, Ammi visnaga*).

B. The alcoholic extract of *Ammi majus* fruit (1 in 10) gives blue fluorescence when examined in the filtered ultraviolet light.

Tests for Purity :
Cereals and Starchy Material: Powdered *Ammi majus* fruit contains no starch granules.
Alcohol (90 %) Extractive: Not less than 33.86 %
Moisture: Not more than 12.0 % determined by the toluene method.
Ash: Not more than 7.0 %

Folk Medicinal Uses:
Fruits, diuretic, carminative, for angina pectoris and asthma. The fruits were used by the ancient Egyptians for treating leucoderma. The drug should be used cautiously, since phototoxic dermatitis following its use for vitiligo has been reported.

Phytopharmaceuticals in the Egyptian Market:
Meladinine and Neo-Meladinine in different dosage forms viz, tablets, creams, lotions and paints **(Memphis).**

Economic Potential:
The plant is and will continue to be of high economic potential for the widespread use of its galenicals as well as its furanocumarins in the treatment of leucoderma. Cultivation of the plant is not favoured by the farmers. This is referred to two reasons: a- the lack of good knowledge of the cultivation of this plant among the farmers, b- the improper harvest methods usually lead to the shedding of the fruits leading to their dispersal and infesting the field in the next season.

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2- **Ammi visnaga (L.) Lam.** Fl. Fr. 3: 462 (1778)

Daucus visnaga L. Sp. P1. ed. 1, 242 (1753)

Arabic	:	*Khillah - Khelal*	خلة – خلال
		Khilla Baladi	خلة بلدى
		Gazar Sheitani	جزر شيطانى
		Kammoun Habashi	كمون حبشى

Berber : Tabellaout
English : Pick-tooth, Tooth pick, Bishop's weed
French : Herbe aux cure-dents
German : Zahnstocherkraut

Morphological Description

Stout, tall, winter annual, with thick stem and pinnatisect leaves. Umbel rays, dense (*ca* 80 *per* umbel), with very numerous long stiff rays and white flowers. The rays spread in flower and become contracted in fruit. Bracts of the involucre, long, filiform and tripartite. The fruiting pedicels are thick and frutescent. Fruit, ovate, laterally compressed, with thick ribs, brownish with violet tinge and splitting into two mericarps (Plates 5 & 6).

Ecology

The plant is an element of the mesophytic community of the cultivated fields where it grows among the crops, on canal banks and in neglected areas close to the fields. It grows mainly in the northern part of Delta. It is cultivated on a limited scale in the Delta for its fruit and dry umbels..

Distribution:

Local : Growing mainly in the Nile region, rare in the Eastern Mediterranean region.
Regional : North Africa : Egypt, Tunisia, Algeria, and Morocco.
Global : North America, Argentina, Chile, Mexico, Europe, Temperate Western Asia.

Status:

The plant is easily cultivated as a winter crop in Egypt. Numerous studies have been undertaken as regards the effect of manure and fertilizers on the yield of the plant. However, there is a great need to conserve the good genetic characters in some cultivars. The plant is safe and is not subjected to threatening impacts.

Parts Used

a-The **fruits**,

Arabic	:	*Bizr Khellah* بذر خلة
English	:	Ammi visnaga fruit, Visnaga fruit.
French	:	Fruits de Khella
German	:	Visnaga Früchte, Bischofskraut Früchte
Latin	:	*Fructus Ammi visnaga*

b-**Toothpicks:** At fruiting, the rays become frutescent, curved and used as tooth picks (Plate 6).

Khella contains not more than 10.0 % of its stalks and foreign organic matter, and yields not less than 1.0 % of the nongylcosidal furanochromone derivatives, calculated as khellin.

Description: Odour, slightly aromatic; taste, aromatic, bitter and slightly pungent. **Macroscopical: Fruit**, cremocarp, usually separated into its 2 mericarps, rarely entire, with a part of the pedicel attached. **Mericarp**, small, ovoid, about 2 mm long and 1 mm broad; crowned with a disc-like nectary, the **stylopod**; brownish to greenish-brown with a violet tinge (Distinction from *Ammi majus*); **externally**, glabrous, marked with 5 distinct, pale brownish, rather broad primary ridges and 4 inconspicuous dark secondary ridges; **internally**, the mericarp shows a pericarp with 6 vittae, 4 in the dorsal and 2 in the commissural side, a large oily orthospermous endosperm and a small apical embryo. **Carpophore**, single, no split; passing at the apex into the raphe of each mericarp.

Microscopical: Epidermis of pericarp consists of polygonal cells, elongated on the ridges, with occasional crystals of calcium oxalate and finely striated cuticle; no hairs. **Mesocarp**, formed of parenchyma, traversed longitudinally by the schizogenous vittae, each surrounded by large, slightly radiating cells, and traversed in the ridges by vascular bundles, each forming a crescent around a comparatively large vitta (Distinction from *A. majus*) and accompanied by fibres and reticulate, lignified cells; the innermost layer of the mesocarp consists of large, polygonal, brown-walled cells, with thick porous inner walls. **Endocarp**. composed of narrow tangentially elongated cells; some of these being regularly arranged in groups, variously oriented, adhering to the brown seed-coat which is formed of similar but wider and somewhat shorter cells. **Endosperm** consists

of polygonal, thick-walled, cellulosic parenehyma, containing fixed oil and numerous small oval aleurone grains, each enclosing a minute rounded globoid and a micro-rosette crystal of calcium oxalate with a dark center. **Carpophore,** traversed by a vascular strand of fibres and spiral vessels.

Constituents

1- Furanochromones ((-pyrones): 2-4% comprising khellin (0.3-1.2%), visnagin (0.05-0.3), khellol and its glucoside, khellenin, khellinol, ammiol and its glucoside, visammiol, khellinone, visnaginone.
2- Pyranocoumarins (visnagans):0.2-0.5 comprising visnadin, samidin and dihydrosamidin.
3- Furanocoumarins: traces of xanthotoxin and ammidin.
4- Flavonoids: 0.02- 0.03% comprising quercetin and isorhamnetin and their 3-sulphates as well as kaempferol.
5- Volatiles : containing among other compounds: camphor, carvone, (-terpineol, terpinen-4-ol, linalool, *cis* and *trans* linalool oxides.
6- Fixed oil: 12-18%. 7- Protein: 14%.

Folk Medicinal Uses:

Fruit, diuretic, appetizer, carminative, stimulant vasodilator, antispasmodic, for urinary disorders, angina pectoris, asthma, and the infusion releases renal stones.

Pharmacological Actions and Indications :

The drug acts as spasmolytic, especially on the musculature of the bronchi, gasterointestinal tract, biliary tract, urinogenital system, the coronary vessels and also as diuretic.

Using K^+(60mM)-depolarized guinea pig aortic strips, the involvement of a Ca^{2+} channel blocking mode of action could be established.

Visnadin exhibits peripheral and coronary vasodilator activities and has been used for the treatment of angina pectoris.

The drug is indicated in whooping cough, cramp-like conditions of gasterointestinal tract, biliary colic, painful menstruation, for removal of small bladder and kidney stones, and in angina pectoris and bronchial asthma. Khellin may have a role to play in the treatment of vitiligo and psoriasis.

Phytomedicines containing standardized extracts are included in cardiac remedies, bronchospasmolytics, spasmolytics, urological remedies and coronary remedies.

Adulterants and Substitutes :

May be adulterated or substituted by fruits of *Ammi majus* which can be detected by macro- and microscopical examination and tests for furanocoumarins.

Authentication :

1- Macro- and microscopically following Egyptian Pharmacopoeia 1984.
2- Pyrones not less than 4% calculated as Khellin.
3- Foreign matter not more than 2%.
4. Loss on drying not more than 10%.
5- Ash not more than 10%, acid-insoluble ash not more than 3.5%.
6- Fruit of *Ammi majus* should be absent.
7- Absence of starch
8- Boil about 0.05g of *Khella* with 5 ml of water for a minute, strain, add 1 or 2 drops of this decoction to 1 ml of solution of sodium hydroxide (1 in 1), and shake; a rose-red colour is produced within 2 minutes.

Phytopharmaceuticals in the Egyptian Market

Ampoules and tablets containg Khellin as single component or in multicomponent pharmaceuticals e.g. Khellalgon capsules **Mepaco**, Khellalgin **(Misr)** and Lynamine, Glucolynamine ampoules **(Memphis)**.

Economic Potential:

The plant is and will continue to be of high economic potential for the widespread use of its galenicals as well as Khellin in the phytotherapy of urinary tract problems. The local supply is not sufficient for the pharmaceutical industry. Farmers are not willing to cultivate the plant due to the fluctuating prices from year to year.

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3- Citrullus colocynthis (L.) Schrader, Linnaea 12: 414 (1838)

Cucumis colocynthis L., Sp, Pl., ed. 1, 1011 (1753)
Colocynthis vulgaris Schrad., Ind. Sem. Hort., Gott., 2 (1832)

Arabic	:	*Handal*	حنضل
		Handhal	حنظل
		Oorky	أوركى
		Tatoor	طاطور
		Hadag	حدج (الثمار)

Berber : Tadjellet, Alkat, Taferzizt, Tifersit, Ubruzi
English : Colycynth, Bitter apple, Bitter gourd
French : Coloquinte, Chicotin
German : Bitterzitrulle, Bitterapfel

Morphological Description:
A perennial very scabred herb with long trailing branches. Leaves, triangular in outline, deeply 3-5 palmate-lobed with pinnate cleft narrow segment. Branched tendrils arise in leaf axis. Flowers, yellow. Young fruits, fleshy, mottled with dark green, turning dry and yellow when ripe apple size, extremely bitter in taste (Fig. 3, Plates 7 & 8).

The plant is very common in sandy places in all the phytogeographical regions of the country. Colocynth presents a curious look with patches here and there in the extensive blazing deserts of all the Arab countries. The plants are suffering from winter and recovering again in summer. They have wonderful adaptation ability to grow up on the hot sandy soil of summer months where scarsely any plant can survive.The tap root is succulent and very deep.

Ecology:
The plant grows in deep sandy habitats. It appears as groups in depressions receiving runoff water (Plate 7).

Distribution:
Local : In sandy habitats in almost all the deserts of Egypt.
Regional : All North African countries.
Global : Semi-deserts and deserts of North Africa, southern Europe, and Asia, from the Canary Islands eastwards to India.

Status:
The plant is safe and is common in all the North African countries. However, cultivation of the plant for medical purposes is recommended. Being a member of the *Cucurbitaceae*, it could be cultivated in a manner similar to water melons. However, it is more drought-resistant. The plant produces numerous fruits every year, *ca* 40-60 fruits *per* plant.

Part Used:
Colocynth; Colocynth Pulp; Bitter Apple.
Colocynth is the dried unripe, but fully grown fruits of *Citrullus colocynthis* (L.) Schrad. deprived of its seeds and hard outer part of pericarp.
Colocynth contains not more than 5.0 *per cent* of its seeds, and not more than 2.0 per cent of the outer sclerenchymatous part of the pericarp.

Description:
Odour, slight, or almost odourless; taste, intensely bitter and persistent.
Macroscopical: Colocynth occurs as light spongy, easily broken, globular masses or in pieces of variable size, up to about 6 cm long and 2 cm thick; white, or pale yellowish-white, with occasional small patches of darker epicarp and consisting of narrow mesocrap and three wide bifid placentas; **externally**, convex with ridges and flattened areas, 5 to 10 mm wide; **internally**, irregularly concave and showing numerous ovoid depressions, about 10 mm long, left by the removal of the seeds. **Seeds**, very few flattened, ovoid, yellowish-white to dark brown, about 7 mm long, 5 mm broad and 2 mm thick, albuminous, with narrow oily endosperm, 2 oily cotyledons and small radicle.

Microscopical: Colocynth, formed of spongy tissue, composed of large, more or less rounded parenchymatous cells, almost devoid of contents, with large intercellular spaces and have thin cellulosic, occasionally lignified walls, with oval or circular pitted areas at the junction of contiguous cells; traversed by bicollateral vascular bundles, having spiral and annular vessels and accompanied in the phloem by irregularly tubular laticiferous vessels, the contents of which give red colour with sulphuric acid. **Epicarp**, if present, shows epidermis of radially elongated cells, occasional stomata of ranunculaceous type, subjacent parenchymatous cells, and an inner layer of isodiametric and radially elongated sclereids. **Seed**, if present, with an epidermis of thick-walled lignified palisade-like cells and inner layers of thick-walled, pitted, or reticulately thickened lignified sclereids. **Endosperm** and **cotyledons**, parenchymatous, with fixed oil and aleurone grains, up to about 7 microns diameter.

Constituents:

Colocynth contains cucurbitacin B and E (a-eleatrin), colocynthin, sterols (a-spinasterol and others), alkanes, aliphatic alcohols alkaloids, and choline base.

The seed contains about 16% fixed oil, reddish-yellow, with green fluorescence, almost odourless, with a very bitter taste.

Folk Medicinal Uses:

The leaves are diuretic and used in treatment of jaundice and asthma. The root is useful in inflammation of breasts, amenorrhoea, rheumatism, joint pains and is used externally in ophthalmia and uterine pains. The fruit is pungent, cooling purgative, anthelmentic, antipyretic and carminative. It cures, tumours, leucoderma, ulcers, asthma, bronchitis, urinary discharge, enlargement of spleen, tuberculous glands of the neck, dyspepsia, constipation, anaemias and throat diseases. The fruit pulp is purgative, diuretic, antiepileptic, and is used against gonorrhoea.

Derived vetrinary preparations which contain colocynth are used for itch. Cataplsm of green or dried plant is used as a remedy for leucoderma; cataplasm resolvent, astringent. Hot sap of plant is used to cure skin diseases of camels. In Morocco, it is used as antihypertensive and antidiabetic.

Pharmacological Actions and Indications

Purgative. The drug exhibited antiinflammatory and antitumor activities. The leaves and pulp extract (i.v.) caused a dose-independent increase in blood pressure in vivo in rats, and both extracts reduced heart-rate and the force of contractions in isolated rabit hearts. The leaf extract(800mg/Kg) p.o.) exhibited antiinflammatory activity in the carrageenan-induced paw oedema test in rats, but was severely toxic (60% of animals died, the remainder had severe diarrhoea and hepatorenal damage).

Toxicity :

The ethanolic extract of the fruits produced stimulation, accompanied by increased motor activity, tremors, convulsions, diarrhoea and rapid irregular respiration preceeding death in mice. The spermatogenic disfunction was also significant. The same extract demonstrated cytotoxic as well as mutagenic effects. It causes irritation of stomach and intestine. It is seldom prescribed alone. It induced haemorrhagic colitis. Three examples of toxic acute colitis were reported after ingestion of colocynth for ritual purposes. Its clinical feature was dysenteric diarrhoea.

Authentication:

- Microscopical examination.
- Petroleum ether extractive, not more than 3% when dried at 100 ^{o}C.
- Ash, not more than 15%.
- Acid-insoluble ash, not more than 8%.

Tests for Purity:

Petroleum-benzine extractive: Not more than 3.0 % when dried at 100^{o}C.
Alcohol (60 *per cent*) extractive: Not less than 23.0 %.
Ash: Not more than 15.0 %.
Acid-insoluble ash, not more than 8.0 %.

Pharmacopeias:

Fruit of colocynth is still official in several pharmacopoeias due to their cathartic value, e.g. Egyptian Pharmacopoeia 1984 and Pharmacopee Francaise 1965.

Phytopharmaceuticals in the Egyptian Market:

No-habit, lotion, **Tri M Medical**.

Economic Potential:

Since the plant grows quite abundantly in the deserts of the North African countries, as well as other Arab countries, their proper utilization is likely to afford a good source of revenue for the Bedouins.

Egypt exported in 1983 ten tons of colocynth ; each at a rate of 652 Egyptian Pounds, 4 tons in 1984 at a rate of 1063 Egyptian Pound and one ton in 1985 at a rate of 1584 Egyptian Pound. Prices expected range from 2000 to 2500 Egyptian Pound *per* ton.

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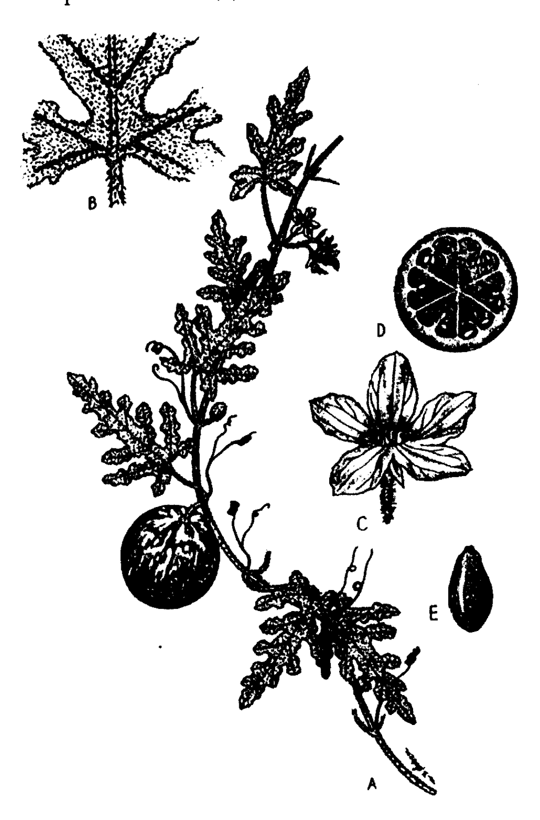


Fig. 3. ***Citrullus colocynthis:*** **A-** Flowering and fruiting branch, **B-** Portion of leaf showing hairs, **C-** Male flower, **D-** T.S. in fruit, **E-** Seed. (After: Jafri, 1977, Flora of Libya, No. 32, Cucurbitaceae).

4- **Datura stramonium L.**,Sp.Pl.,ed.1,179 (1753)

Datura tatula L.,Sp.Pl.,ed.2, 256 (1759)

Arabic : *Datura* داتورة

Nafir نفير

Taturah طاطورة

Berber : Tabourzigt, Tidilla.
French : Datura, Stromoine, Pomme epineuse, Herbe aux sorcieres, Pomme Èpineuse, Dature, Endormie Endormie, Herbe du diable. Pomme du diable.
German : Echter Stechapfel, Tollkraut.

Morphological Description

A glabrous, green-stemmed annual which attains a height of one metre or more. Leaves, ovate, sinuate or angled or even cut-toothed. Flowers, large, 8-20 cm long, white or violet. Capsules ovoid, erect, with stout prickles, dehiscent, 4-valvular. Seeds numerous, black, reniform (Fig. 4, Plate 8).

Ecology:

The plant is occasionally cultivated, also escapes cultivation, in the gardens. The plant is cultivated in many European countries as well as the United States of America. It can easily be grown from seeds. It prefers a rich calcareous soil. When fully developed, the plants should better be spaced at distances of one metre from each other in a row. It is sensitive to frost and hence requires special shelter during the severe winters. An acre of land yields about 450-680 kg of leaves and about 320 kg of seeds. Application of nitrogenous manures favours both vegetative growth and alkaloid formation. For the production of higher alkaloid content, large-leaved tetraploid plants have been raised by colchicine treatment with the result that double the amount of alkaloids have been produced by these plants. Alkaloids have been found to concentrate in the upper epidermal cells, phloem parenchyma, midrib and the petiole. The upper leaves and branches are more rich in alkaloids than the lower ones.

Part Used

Stramonium is the dried leaves with or without the flowering tops of *Datura stramonium* L. collected from the plant in flower.

Description:

The dried leaves are greyish-green in colour, brittle, twisted and often broken. The leaves are variable, 8-25 cm long and 7-17 cm wide, shortly petiolate, ovate or triangular-ovate in shape; they are acuminate at the apex and have a sinuate dentate margin. The fresh leaf is somewhat dagger-shaped. The flowers is white, with streaks of purple colour appearing sometimes on the ribs and tips of the corolla lobes. They are solitary in the axils and point upward. They produce round greenish fruits or capsules that enclose black, flat, reticulated, kidney-shaped seeds. The plant has a bitter, saline taste with a disagreable odour when fresh but the dried plant has a tea- like odour.

Constitutents:

The plant is a known source of the tropane alkaloids hyoscyamine, atropine and scopolamine. The total alkaloid yield has been estimated to be between 0.06 and 0.50%. The young leaves contain mainly scopolamine, whereas hyoscyamine is the major constituent of the mature leaves. In addition to these alkaloids, the plant contains other minor tropane derivatives, as well as chlorogenic acid and lectins. The seeds contain up to 30% of fixed oil and about 0.2% alkaloids. Withanolides comprising a new 21-hydroxy withanolide were isolated from the leaves. Peudopeptide (gamma-L-glutamyl-L-aspartic acid was also reported.

Folk Medicinal Uses:

The whole plant is used for asthma and as a sedative. The leaf extract is an ingredient in remedies for cough and chest complains. Plant boiled in water is taken to ease asthmatic breathing and for sedation. Dried leaves and flowers are smoked as tobacco to relieve difficult breathing. Seeds are taken as analgesic in small doses. The seeds of ripe fruits are burnt and the smoke inhaled for treating epilepsy. *D. stramonium* is an alternative medicine treatment for parkinson's disease.

Pharmacological Actions and Indications:

The drug is valued in clinical medicine as a cholinergic agent. The alkaloids of *Datura* are used as spasmolytic, antiasthmatic and anticholinergic The drug has been employed in proprietary products for the treatment of excessive salivation in parkinsonís disease. It is used in some skin diseases, e.g. tlacotes.

In high doses, *Datura* induces strong hypnosis. Hyoscine, also known as scopolamine, in therapeutic doses causes CNS supression, which manifests as

drowsiness, amnesia, fatigue and dreamless sleep with a marked reduction in rapid movement. Scopolamine is employed as an adjunt to anaesthetic agents or for preanaesthetic medication. Datura leaves are incorporated into cigars smoked as a euphoria inducing substance and frequently abused.

Toxicity:

All parts of the plant are toxic, especially the seeds. Consumpsion of any part of the plant can result in severe anticholinergic toxicity, atropine poisoning, hallucination and mydriasis. Rubbing skin and eyes after contact with this plant is dangerous. Symptoms include headache, nausea, vertigo, extreme thirst, dry burning sensation in the skin, general nervous excitation, dilated pupils, loss of sight and voluntary motion, palpitation of the heart; in extreme cases, mania convulsions and death.

Adulterants and Substitutes:

The common adulterants of *D. stramonium* leaves are *Xanthium* species (Asteraceae), *Carthamus* (Asteraceae) and *Chenopodium* (Chenopodiaceae) which are easily distinguished from the genuine drug.

Authentication:

- Characteristic morphology of leaves and flowers.
- Microscopical features.
- After shaking the seeds with water a light green fluorescence may be seen under long wavelength (365 nm) UV light.

Pharmacopoeias:

Egyptian Pharmacopoeia 1984.

Phytopharmaceuticals in the Egyptian Market:

There are many pharmaceuticals in the market containing the active principles derived from *Datura*, especially the alkaloids, such as Nospa (**EPICO**), Buscopan, Buscopan Compositum Buscopan plus (CID, Boehringer Irgelheim), Butacid (**CID**), Farcorelaxin (**Pharco**), Spasmoein (**Memphis**) etc.

Fluid extract, dry extract, standardized powder and tincture are ingredients of many formulations.

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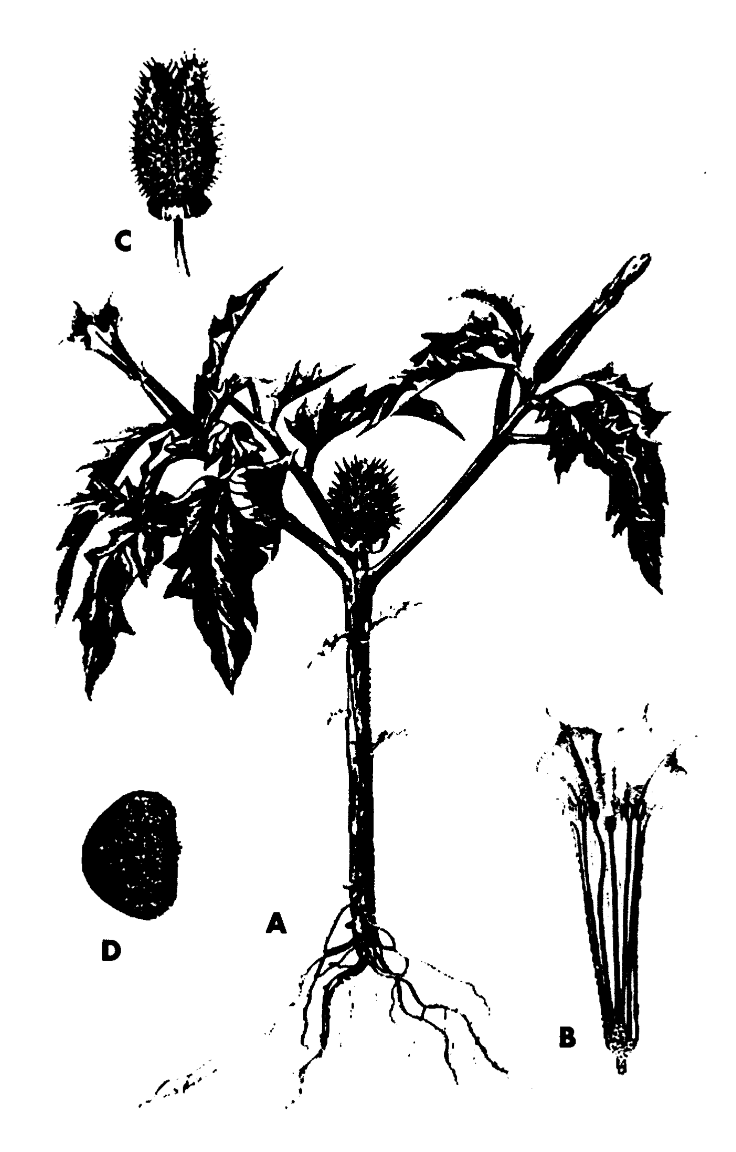


Fig.4. ***Datura stramonium*****: A**- Habit, **B**- Flower, **C**- Mature fruit showing dehiscence, **D**- Seed.
(After: Siddiqi, 1978, Flora of Libya, No. 62, Solanaceae).

5- **Glycyrrhiza glabra L.** Sp.Pl.ed.1:741 (1753)

Arabic : *Shagaret es-sûs* شجرة السوس

Erqsûs عرق سوس

English : Liquorice, Sweet wood.
French : Réglisse, Reglisse glabre , Reglisse Officinale.
German : Echtes Sussholz.
Italian : Dolce radice, Regolizia, Logorizia.
Turkish : Meyan kok, Meyan otu, Biyan kok, Ayi kulozi.
Berber : Azrar azidane.

Morphological Description:
Erect perennial, 30-60(-100) cm. or more, simple or branched from the base, stems striate with raised ridges especially above, glabrous or sparingly pilose, and furnished throughout with sessile, shining, viscid glands. Stipules brownish-membranous, ca 2 mm, subulate, falling early. Leaves imparipinnate, 10-25 cm long, petiole 1-5-3 cm, petiole and rhachis ±ridged, often pilose at least below, densely glandular; leaflets in 4-8 pairs, lanceolate, elliptic, ovate or oblong, 20-40(-55) x 5-18(-25) mm, entire, acute or retuse above, densely punctate-glandular on the lower surface, hairy on the midrib below and with scattered hairs occasionally also on the surface, glabrous and eglandular above; petiolules ca 2 mm, commonly pilose. Inflorescence racemose, elongate and lax or shorter and more compact, shorter than or subequalling, rarely much longer than the subtending leaf, flowers very shortly pedicellate; peduncles 1-5-3 cm., glandular and shortly hairy; bracts ca 1 mm. lanceolate, brownish membranous falling early. Calyx 4-6 mm, tubular, glabrous or sparingly hairy, glandular, teeth lanceolate, the upper pair broader and slightly shorter, fused below, the lower 3 narrower and about equalling the tube. Corolla pinkish-blue to purple; standard elliptic-lanceolate, 9-12 x 3-5 mm, acute or acuminate at the apex, attenuate to a short claw below; wings 7-10 mm, lamina falcate-oblong, acute, 3 times as long as the claw, auricles short and blunt; keel 6-8 mm, lamina narrowly oblong, shortly acuminate, about twice as long as the claw. Pod linear-oblong, compressed, *ca* 5 mm. wide, up to 30 mm long according to the number of seeds (1-7), straight or almost so, shortly beaked, glabrous or glandular, ± constricted between the seeds, tardily dehiscent. Seeds subspherical, smooth, ca 2.5-3 mm, light to dark brown (Fig. 5, Plate 9).

Ecology:
The plant is salt and drought tolerant. It grows in Egypt in the oases, where there are salinity and drainage problems.

Distribution:

Local : Bahariyah and Siwa oases.

Regional: Mediterranean region and Middle East countries

Global : Mediterranean and E. Europe (native in Sardinia, Italy, Sicily, Yogoslavia, Albania, Greece, Bulgaria, Rumania C. & S. Russia) France, Spain, Crete Rhodes, Cyperus, Syria, Lebanon, Palestine, Jordan, Iraq, Turkey, Caucasus, Iran, Afghanistan, W. Siberia, C. Asia, and N. W. India.

Status:
The plant is naturalized in the oases. However, it is not well used for its therapeutic value. Importation is the followed practice. There is a need to make use of the waste land and slightly saline areas to cultivate this plant.

Part Used:
Liquorice is the dried, peeled or unpeeled roots and rhizomes (stolons) of *Glycyrrhiza glabra* L. and its varieties known as :

Arabic : *Erqusous* عرق سوس

Sous سوس

Jizrulsous جذر السوس

English : Liquorice, Liquorice root, Sweet wood, Licorice

French : Réglisse officinale, Racine de rÈglisse. Bois doux, Racine douce.

German : Sussholz wurzel, Spanisches or Russisches Sussholz, Lak- ritzenwurzel.

Latin : *Radix Glycyrrhizae, Rad. Glycyrrh., Glycyrrhiza, Liquiritiae Radix, Rhizoma Glycyrrhiza nativum, Liquiritiae.*

Description:

Liquorice occurs in nearly cylindrical pieces; 14-40 cm or more long and 0.5-5.0 cm in diameter. Unpeeled pieces are dark brown, reddish brown or purplish brown, longitudinally wrinkled. Peeled liquorice is externally yellow, smooth, fibrous, finely or roughly striated. It has a faint and characteristic odour and a very sweet taste, almost free from bitterness and acridity.

Constituents:

The major constituent of *Glycyrrhiza glabra* is 6-13 %.triterpene saponin glycyrrhizin as potassium and calcium salts which have a sweet taste . Further triterpenes of *G. glabra* are: liquiritic acid, glabrolide, isoglabrolide, deoxyglabrolide, glabric acid, deoxyglycyrrhetic acid, 18 (-hydroxyglycyrrhetic acid, glycyrrhetol, 21 (-hydroxyisoglabrolide, 23-hydroxyglycyrrhetic acid, 24-hydroxy- 11-deoxy-glycyrrhetic acid, 24-hydroxyliquiritic acid, liquiridiolic acid, 28- hydroxyglycyrrhetic acid and soyasaponins.

Other components include:

Flavones, isoflavones, chalcones, rhamnoliquiritin, liquiritin, liquiritoside liquiritigenin, isoliquiritin, isoliquiritoside, isoliquiritigenin, neoisoliquiritin, neoliquiritin, licuroside, saponaretin, vitexin, pinocembrin, prunetin, glabranin, formononetin, glabrone, glabrene, glabridin, glabrol, 7-acetoxy-2-methyl-isoflavone, 7-methoxy-2-methyl-isoflavone, 7-hydroxy-2-methyl- isoflavone, licochalcones A & B,kanzonol-T, 4-hydroxychalcone, liqcoumarin, neolicuroside, herniarin, umbelliferone, licoflavanone, glycyrrhizoflavone, glycyrrhisoflavanone, licocoumarone, quercetin, isoquercitrin, kaempferol, astragalin, astragalin monoacetate, isorhamnetin, genkwanin, folerogenin and isomucronulatol, glabrocoumarins A&B

The volatile fraction (0.04-0.6%) contains g-nonalactone, linalool, a-terpineol, p-cymene, thujone, fenchone, guaiacol, thymol, geraniol, eugenol, estragole, anethole, indole, cumic and hexanoic acids.

A polysaccaride (glycyrrhizan GA), 5-15% sugars (glucose and sucrose), about 1-2% asparagine, a bitter principle glycyramarin in the outer tissues, 22-23-dihydrostigmasterol,sitosterol,mannitol, about 20% starch.

Folk Medicinal Uses:

Extract of root is used for hoarseness of voice, cough, respiratory ailments, gastritis, abdominal pains, diuretic, febrifuge, emmenagogue, to relax uterine muscles, demulcent and expectorant.

Infusion of root for cough due to its emollient, depurative and sweetening properties. Decoction boiled to facilitate the period due to the presence of oestrogenic hormones in appreciable amounts.

Roots chewed for throat troubles and rheumatism, Addisonís disease and various inflammatory conditions. Refreshing drink made from root, antispasmodic, and for gastric ulcers. Liquorice is used as a flavouring agent in tobacco and confectionary and to mask taste of bitter drugs. It is added to beer to increase foaminess.

Pharmacological Action and Indications:
Glycyrrhizin obtained from liquorice cured chronic gastric ulcers orally. Glycyrrhizin also exhibited an antiviral effect against various viruses including human immunodeficiency virusus.

Glycyrrhiza glabra extract, glycyrrhizin and 18 alpha- and 18 beta-glycyrrheinic acids inhibited mutagenecity induced by Salmonella typhymorium. Polysaccharides of G.glabra have a pronounced activity on the reticuloendothelial system, immune system. Isoliquiritigenin is an aldose-reductase inhibitor which may be effective in preventing diabetic complications.

It has an antiallergic and antiinflammatory actions, and used in treatment of peptic ulcer and Addison's disease. Both glycyrrhizin and its aglycone prevent the development of experimental cirrhosis in animals.

Toxicity:
High doses of liquorice preparations should not be taken for longer than 4-6 weeks. During this time a potassium rich diet should be taken e.g. bananas, dried apricots and dates. Persons with circulatory problems should avoid consumption of significant amounts of liquirice.

Authentication:
Liquorice should yield not less than 25 % water-soluble extractives; ash, not more than 6.5% for the peeled and not more than 10 % for the unpeeled. Acid-insoluble ash, not more than 1.5% for the peeled, and not more than 2.5 % for the unpeeled.

Substitutes:
Glycyrrhiza uralensis Fisher or other species or varieties of the same genus.

Adulterants:
Powdered liquorice may be adulterated with flour, or olive stones.

Pharmacopoeias:
DAB: 10, 1991; Ph . Eur. II, 1980; AB-DDR, 1979; Ph. Hlv. VII, 1987; OAB, 1990, J. Pharm; 1986; Chinese Pharm.. 1985

Phytopharmaceuticals in the Egyptian Market:
Compound powder of liquorice: 15 g / 100 g **(Kahira)** Iopnol syrup: Dry extract of liquorice 1.1 g/ 100 ml **(Kahira)**; Glucafene syrup Extract Glycyrrhizae 5 g/180 ml **(Memphis)**; Meloids pastiles.: liquirice juice 93.3 % **(Boots)**, 7 Herbs 20 mg liquorice/400mg capsule (Misr Co).

Candies sold in the market are called *Rub sous*.

Cultivation:
The plant can be considered a harmful weed, where it occurs in arable land. However, it is very useful for the important constituents of the root stock. The liquorice root contains the sugary substance which gives liquorice extract its peculiar flavor and slight demulcent property.

The plants grow wild but has been domesticated in Siwa and Bahariyah oases. The plant grows in the Mediterranean and East European countries, Spain and Syria where it produces considerable amounts of liquroice.

Though the plant tolerates drought, it can grow in waterlogged soils. It tolerates considerable salinity. Cultivation of liquorice is not recommended on arable or good fertile land, as it is too difficult to eradicate it once it has been established. It is best to cultivate the plant in waste land with salinity levels not proper for traditional crops. Natural salines or anthropogenic salines and drainage water could be used in cultivation of this plant.

Cultivation of liquorice would permit economic use of waste, slightly saline land and low quality drainage water This plant could help in lowering the level of the water table by absorption and transpiration, i.e. helps in biological drainage in the oases.

The plant is cultivated using cuttings of the underground rootstocks. Cuttings are 10 to 15 cm long. The proper time for cultivation is February.

Planting rate:
One feddan requires about 15,000 cuttings. This amount of cuttings can be obtained from a field of liquorice with an area of 500 sq. m.

Method of cultivation:
Along lines 100-120 cm apart, with cuttings planted at a distance of 50 cm.

Irrigation:
The plant needs moderate amounts of water. It may be irrigated once every month in summer and about 1.5 month in winter. When the plant is established there is no need for regular irrigation, especially when it is cultivated in wetland.

Fertilizers:
Manure is important. Superphosphate and Potassium Sulphate could be added under intensive agriculture However, when the plant is cultivated in waste land, it can be grown without fertilizers. The growth of the plant even with limited productivity under minimal tillage and agricultural operations should be economic by virtue of its use in rehabilitation of otherwise useless saline and waterlogged land.

Harvest:
Harvest starts by cutting of the vegetative growth at a height of 5 cm from the ground level. The land is then deeply ploughed. The rootstocks are removed, cleaned. They may be cut into pieces 5 - 10 cm long; the bark is removed by hand.

Sun drying is preferred. The dried pieces are then ground into a coarse powder. The best time for harvest is late summer and early dry root stocks from autumn. one Feddan produces 2 - 3 tons which the bark is removed, The green vegetative part has a weight of 15 - 20 tons per Feddan

If we are reducing the tillage operations and the inputs, the yield also will be reduced. However, production of liquorice from wasteland is economic.

Extraction:
Liquorice powder could be extracted at normal temperature or at higher temperature 130 - 150°C.

Marketing:
The main producers and exporters of liquotice contaning underground parts are: Iran, Russia, and China, while the major exporters of the extract are: USA, France, Italy, Iran, Iraq, Israel, Japan, Turkey and China. The main importer of liquorice roots is U.S.A., which is also the main exporter of the extract. Japan is the second largest importer of liquorice - about 10,000 tons roots and 200 - 250 tons dry extracts per year. France and Italy are European prioneers in importing liquorice. The main sources are China and Russia. It is to be noted that a small part is used in medicine, while the major part is used for flavouring.

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Fig. 5. ***Glycyrrhiza glabra*****: A-** Flowering branch, **B-** A part of inflorescenve,
C- Fruiting branch, **D-** Roots cut into pieces.
(After: Chakravarty, 1976, Plant Wealth of Iraq).

6-Hyoscyamus muticus L., Mant., 45 (1767)

Arabic	:	*Sakaraan, Sekran*	سكران
		Semm el-faar	سم الفار
		Shagaretes-sakraan	شجرة السكران

English : Egyptian Henbane.
Latin : Herba Hyoscyami mutici.
French : Jusquiame d Egypt.
German : Schwarzes Bilsenkraut.

Morphological description:
A stout fleshy richly branched glabrous perennial with ovate-rhombic leaves. The leaves are broad, thick, fleshy: radical leaves reach 15-20 cm in length; margins are dentate. The upper leaves are smaller, toothed, with short petioles. The flowers are arranged in dense-flowered spikes; funnel-shaped. The corolla is white or green or purple with violet spots. The fruits are unarmed capsules opening by a lid, included in the persistant calyx. The plant has a characteristc odour, bitter taste and is slightly acid and salty. The fruit contains tremendous number of seeds (Plate 10).

Ecology:
The plant occurs in the desert in patches occupying depressions in sandy areas which receive runoff water. It grows in areas where the measured rainfall averages 20 mm or more per year. Water runoff increases the water revenue in habitats supporting the wild plant.

Distribution:
Local : Almost all the phytogeographical regions of the country
Regional: In the deserts of the Middle East
Global : In the deserts of the Middle East

Status:
The plant is fairly common. However, the supply from wild plants is not sufficient for industrialization.

Part Used:
The above-ground flowering herb.

Description:

Egyptian *Hyoscyamus* occurs generally in matted masses or broken loose pieces of shrivelled leaves; intermixed with stems and flowering tops and also few fruits; odour, slightly foetid and narcotic; taste, bitter, acrid especially on chewing.

Macroscopical:

Stem, cylindrical, slightly compressed, greyish-yellow, finely longitudinally striated slightly hairy; hollow, with hairy branches. Leaf, pale green to yellowish, petiolate or nearly sessile; varying in shape and size. **Petiole**, up to 9 cm long. **Lamina**, oval rhomboidal to broadly elliptical, up to 15 cm long; tappering to an equal base and acuminate apex; entire or with 2 to 5 triangular acute teeth on each side; both surfaces, densely hairy; **midrib**, broad, prominent on the lower surface; venation, pinnate reticulate, the main side veins, at an angle of 45 degree to the midrib. **Lower leaves**, smaller, shortly petiolate to nearly sessile; with less teeth to entire margin. **Flowers**, crowded together in a more or less unilateral cyme; each shortly pedicellate, pushed to one side of a large, hairy, leafy bract. **Bract** usually ovate lanceolate to narrowly lanceolate. **Calyx**, very hairy, tubular, striated 2 to 4 cm long and 2 cm wide at the mouth, with 5 short, unequal triangular obtuse teeth. **Corolla**, when dried yellowish sometimes with deep coloured patches, zygomorphic, funnel shaped, with 5 broad, unequal lobes, slightly longer than the calyx tube and almost of the same width at the mouth. **Stamens**, 5, epipetalous, unequal in length, with hairy purplish filaments and brownish or sometimes purplish anthers. **Ovary**, ovoid, superior, bicarpellary, bilocular, slightly hairy, containing numerous campylotropous ovules, attached to axile placenta. **Fruit**, pyxis, enclosed in the persistent calyx, cylindrical, 1.5 cm long and 0.6 cm broad, slightly laterally compressed, apiculate, with or without the lid. **Seed**, minute, yellowish-grey to brown, more or less reniform, laterally compressed, about 1 mm long, with reticulate testa; internally, shows a curved embryo, embedded in an oily endosperm.

Constituents:

It contains up to 1.3% and not less than 0.8 percent of total alkaloids, calculated as hyoscyamine. (leaf alkaloids 1.70%, ripe fruits 1.34%, stems 0.569%, flowers,2.0%). Other alkaloids are : hyoscine 0.02%, tigloidine, cuscohygrine, hygrine, apohyoscine, atropine, norhyoscine, 3 a-tigloyloxytropine, noratropine & apoatropine. Maximum crop growth and alkaloid yield were obtained when sown from 25. October to 25.November at a spacing of 30x30 cm.

Folk Medical Uses:

The plant relieves painful spasmodic conditions of non-striated muscles, characteristic of lead colic and irritation of the bladder. It is used to allay nervous irritation of hysteria and irritable cough. Fresh leaf cataplasm allays pain. Smoke of cigarettes is effective against asthma. It is used in toothache, cough mixtures and for treatment of some forms of fever.

Pharmacological Actions and Indications:

It is used as cerebral and spinal sedative, hypnotic, narcotic in insomnia when opium can not be used. It also relieves the gripping caused by drastic purgatives. It is prescribed in cases of irritable bladder, in irritable cough, and to allay nervous irritation of various forms of hysteria,

Authentication:

Egyptian *Hyoscyamus* contains not more than 45.0% of its stems, not exceeding 10 mm in diameter, and not more than 2.0% of foreign organic matter, and yields not less than 0.8% of total alkaloids calculated as hyoscyamine. It should give positive test for alkaloids. It should be free from ammoniacal odor, ash not more than 30.0%, and acid-insoluble ash not more than 15.0%.

It should be stored in well-closed containers, in a cool dry place, protected from light.

Substitutes:

- *Hyoscyamus niger* herb.
- *Datura strammonium* herb.
- *Hyoscyamus albus* herb.
- *Atropa belladonna* herb.

Adulterants:

- Exhausted Egyptian ***Hyoscyamus.***
- Deteriorated Egyptian ***Hyoscyamus.***

Pharmacopoeias:

Egyption pharmacopoeia 1984.

Phytopharmaceuticals in the Egyptian market:

The following pharmaceutical forms are used:

- ***Hyoscyamus muticus*** fluid extracts.
- ***Herba Hyoscyami mutici.***
- Standardized powder of ***Hyoscyamus muticus.***
- Tincture of Egyptian ***Hyoscyamus.***
- Avicenne powder, **Kahira**, 20 g ***Hyoscyamus*** leaves, 75 g.
- Buchu and ***Hyoscyamus*** mixture.

Cultivation:
The plant is best cultivated by transplants. Seeds are sown in the nursery during the period February - April or September - October. Transplanting starts 45 days after sowing. Transplants should be 8 cm high and have at least three leaves. Cultivation in summer is preferred as the growth rate is higher with high temperature.

Rate of seeding:
For one Feddan, 150 gm seeds are needed to be sown in the nursery. The seeds are minute, so this amount may produce almost 20,000 transplants.

Seeds could be obtained easily form the naturally growing *Hyoscyamus* plants along Cairo - Ismailia or Cairo - Suez roads.

Transplanting:
Transplanting should be in moist soil.

Irrigation:
Hyoscyamus is a sensitive plant to water. It grows rapidly with irrigation, but with very low alkaloid content. Irrigation could be every month in summer and every one month and half in winter.

After the establishment of the plant, and the roots reach the permanently wet layer at a depth of 60 cm or more, there is no need for irrigation.

Harvest:
The proper time for cutting the herb is during flowering and before fruiting. Cutting is performed to leave a stump of 5 cm above the ground level.

Drying and preparation:
The cut twigs and leaves are dried in air. It should be continuously turned to avoid the growth of microorganisms due to its succulent nature. It is best to dry the herb in shade.

Yield:
The yield as a dry herb amounts to 7 - 8 ton per feddan. The alkaloid content is higher in plants growing in the desert than those growing in the coastal region or in lower Egypt.

The plant exhibits good growth in light soils and the alkaloid content is higher under limited water supply. The plant is a water - economic desert plant.

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PLANTAGO spp.

The genus *Plantago* comprises 21 species growing in Egypt. Some of them are very rare, others are common either in the desert or the cultivated land. The seeds of the plantain family are well-known to be a good source of mucilages, an important group of drugs, both from the pharmaceutical as well as the therapeutic viewpoint. The most important species from these points are : *P. ovata, P. afra* for their seeds and *P. lanceolata* for the herb and leaves. The seeds of *Plantago afra* and *P.ovata* are official drugs in many pharmacopoeias. The leaves of *P. lanceolata* is pharmacopoeial in the German Pharmacopoeia.

7-Plantago afra L., Sp. Pl., ed. 2, 168 (1762)

Plantago psyllium L., Sp. Pl., ed. 2, 167 (1762),
non L., Sp. ed. 1, 115 (1753)
Plantago parviflora Desf., Fl. Atlant. 1: 141 (1798).

Arabic	:	*Qatoona*	قطونة
		Hashishet el-brageeth	حشيشة البراغيت
		Asloudj	عسلوج
		Merwash	مرواش
		Harmola	حرمولة
		Umm rwis	أم رويس

English : Flea wort.
French : Herbe aux puces, Puciere, Psyllium.
German : Flohwegerich.

Morphological Description:
A stout richly branched annual herb. The plant is glabrous or glandular hairy with distinct stem. Leaves opposite, linear. Flowers in long peduncled heads (Plate 11).

Ecology :
The plant is rare and grows in particular sandy habitats.

Distribution:

Local	:	It is of rare occurrence in the Mediterranean, Arabian Desert, Red Sea, Gebel Elba and Sinai regions.
Regional	:	North Africa
Global	:	South Europe

Status :
The plant is rare. It is endangered due to the threatening of its habitats. It needs conservation *ex situ*. It is cultivated and sometimes becomes a weed in the fields of cumin in Upper Egypt. It is called by the farmers: *kammoun dakar* (*dakar* : An Arabic word denoting male).

Part Used:
The seed known as

Arabic	:	*Bizr qatoona*	بذر قطونة
		Habbul Baraghit	حب البراغيت
English	:	Flea Seed; Pulicaria Seed;	
French	:	PuciÈre	
German	:	Flohsamen	

Psyllium contains not more than 5.0 % of foreign organic matter.

Description:
Odourless, or having very weak, not characteristic odour; taste, mucilaginous, and slightly bitter.

Macroscopical: Seed of *P. psyllium*, boat-shaped, elongated; oblong to oval, with rounded ends; dark brown, shinning and glossy, transparent; 2 to 3.2 mm long, and 0.6 to 1.5 mm wide; **dorsal side**, convex, smooth and shinning, having, in the middle, a slight transverse constriction and a light-coloured spot, running almost the whole length of the seed, indicating the position of the embryo, **ventral side**, concave, with a longitudinal deep furrow, having, in its middle, a pale, circular scar, the hilum. The seed is hard. When it is soaked in water, it swells becoming surrounded with a layer of transparent, colourless mucilage (Distinction from seeds of *Plantago lanceolata*); it is reniform in cross section, and formed of thin brown, mucilaginous testa, translucent, hard horny endosperm filling the seed almost completely, and a straight embryo, lying near the dorsal surface, and having two cotyledons with their upper surface flattened adjacent, in the middle of the seed. 100 seeds weight 0.07 to 0.14 g.

Microscopical: Testa, the outer epidermis is thin, formed of short small cells, 2 to 10 microns high (in glycerin); mucilaginous on the convex side of the seed, and swell radially in water to 70 microns (Distinction from seeds of other *Plantago* species); but the cells on the ventral side are not mucilaginous and do not swell in water. The epidermis is followed by a layer of small, colourless collapsed cells, the remains of the nutritive layer. The inner epidermis of the testa is formed of small rectangular, cutinised cells, containing a dark brown pigment. **Endosperm,** of thick-walled cellulosic cells, with simple pits and granular contents of protein and oil. **Embryo,** of thin-walled cellulosic cells, with minute aleurone grains and oil.

Constituents:
Mucilage in the epidermis of the testa.

Pharmacopoeias:

Egyptian Pharmacopoeia	1984	British Pharmacopoeia	1993
US Pharmacopoeia	1995	Indian Pharmacopoeia	1985

Use in Folk Medicine:
Seeds previously mixed with milk overnight are used against all sorts of dysentry, gastroduodenal ulcers, diarrhoea, chronic constipation. Seeds, emollient, mechanical laxative. Decoction of seeds in cases of internal haemorrhoids. Plantago seeds are used in medicine almost exclusiovely in the treatment of chronic constipation and dysentric disorders. The efficiency of the drug would appear to be entirely due to the large quantities of mucilage in the seeds.

Action and Uses:
Emollient; in chronic constipation; demulcent.

Adulterants and Substitutes:
The dried ripe seeds of other *Plantago* species.

Phytopharmaceuticals in the Egyptian Market :
Metamucil (**Searle**), 50% husk.

Authentication:
1- Macro- and microscopical investigation.
2- **Seeds** of *P. arlnaria*: Differ from those of *P. psyllium*, in being elliptical to elongated, mostly larger in size; 2.4 to 4 mm long, 1.2 to 2.5 mm broad; paler in colour; and showing several layers of collapsed cells in the nutritive layer. 100 seeds weigh from 0.180 to 0.2 g.
3- **Swelling Factor**: Mix 1.0 g of Psyllium with 25 ml of water or of 0.1 M sodium

chloride in a measuring cylinder with glass stopper and graduated to a height of 100 to 125 mm and each division equivalent to 0.2 ml. Shake gently and occasionally during 1 hour, and leave for 6 hours at 15oC to 20oC. Read the volume of the seeds and the surrounding mucilage; this is not less than 10 ml.

4- **Ash**: not more than 3.0 per cent.

Storage:

In tightly-closed containers in a cool place.

Cultivation:

The plant is cultivated in France, where the planting takes place early in March. The plants mature about the end of August. When the entire field is about three-quarters mature the plants are mowed between dawn and 8 a.m. when the dew is heaviest, so as to prevent many of the seeds from falling during the mowing opertation. The plants are allowed to partially dry in the sun, and are then transported to the threshing floor. After threshing, the seeds are cleaned by the means of blowers.

The plant can be cultivated in Egypt as the winter field crops, i.e. in October or November. Maturity is expected to be reached by the end of spring months.

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8- **Plantago lanceolata L.**, Sp. Pl., ed. 1,114 (1753)

Arabic : *Athan el-kabsh* آذان الكبش

English : Ribwort, Great hen plant, Rib-grass
French : Plantain lanceole, Oreille de livre
German : Spitzwegerich

Morphological Description:
A stemless perennial herb, nearly glabrous to sparsely pubescent, 15-60 cm high. Leaves rosulate, long-elliptic to lanceolate, or nearly broadly elliptic, up to ca. 25 cm long, 6 cm wide, acute, tapering at base to a petiole, 3-7 parallel-veined. Spikes cylindrical, tapering somewhat toward apex, dense, 2-6(10) cm long, ca 0.8 cm wide, on sulcate angled scapes, usually well exceeding the leaves when mature. Bracts, ovate-acuminate,glabrous, scarious-margined, equalling or shorter than the calyx. Sepals, sometimes sparsely ciliate at apex, scarious-margined, reduced to 3, the 2 anterior ones coalescent into a single, 2-striped, weakly-emarginate unkeeled lobe, the 2 posterior ones separate, keeled. Corolla lobes, ovate-triangular, glabrous. Capsule, oblong, 2-3 mm long. Seeds, 2, laterally oblong, dark brown, ca. 2 mm long (Plate 11).

Ecology:
Moist habitats in cultivated land and lawns.

Distribution:
Local : The plant is very rare in the Nile Delta.
Regional : N. Africa and Arabia.
Global : Widespread in many continents.

Status:
Due to the rarity of the plant and its confinement to a particular site in Egypt (Cairo-Inshas road), the plant seems to be endangered.

Part Used:
The herb (also the leaf) known as
Arabic : *Athan el-kabsh.*
English : Great Hen plant, plantain Herb, Ribwort.
French : Oreille de livre, herbe de plantain, blond d'Allemagne
German : Spitzwegerichkraut, Heilpsyllium, Wundwegerich.

Description:

Macroscopical:

The light to greyish-green, glabrous or sparsely pubescent, pieces of leaf have almost parallel whitish green nerves that are prominent on the lower surface. Longitudinally grooved, green to brownish black fragments of petiole and fragments of the brown, cylindrical flowering spike with its crowded membranaceous bracts are also present. Taste: mucilagenous, somewhat bitter and salty.

Constituents:

1- Iridoids: aucubin (0.3 - 2.5%), catalpol (0.3 - 1.1%) and asperuloside.
2- Mucilage: ca 6.5% comprising at least four polysaccharides.
3- Phenolics: tannins; p-hydroxy benzoic, protocatechuic, gentisic, chlorogenic, neochlorogenic acids, aesculetin; flavonoids including apigenin, luteolin and scutellarein.
4- Inorganic substances with a high proportion of zinc, potassium and silicic acid.
5- Saponin with antimicrobial activity.

Folk Medical Uses:

The pressed juice of the fresh herb is applied externally as a wound-healing and inflammation-inhibiting remedy. An ointment (10% leaf powder) is used in the same way. The drug is also considered to be haemostyptic.

Action and Uses:

- The herb is used to alleviate irritation in catarrh of upper respiratory tract (effect of mucilage and tannins).
- Macerates, dried extracts, syrups, press juice from the fresh plant, and pastilles are all used for treating inflammation of mouth and throat.
- Phenylethanoids isolated from the herb showed inhibitory effects on arachidonic acid-induced mouse ear edema.
- Antibacterial as well as hepatoprotective activities had been attributed to aucubin. Decoctions of the leaves induced, after i.v. administration, interferon formation.

Toxicity:

None.

Authentication:
1- Macro- and Micromorphology.
2- TLC evaluation.
3- Swelling index: not less than 6.
4- Foreign organic matter: not more than 5% dark to very dark brown fragments, not more than 2% other foreign organic matter.
5- Loss on drying not more than 10%.
6- Ash: not more than 15%.

Pharmacopoeias:
1- DAB 10.
2- Pharmacopoeia Helvetica VII.

Adulterants and Substitutes:
Very rare. Occasionally, with the similar looking leaves of *Digitalis lanata* (detected by microscopy).

Phytopharmacenticals in The Egyptian Market:
Not available.

Economical Importance:
The plant is used medicinally in Europe and other countries. Several formulations are also available. The plant is of potential economic importance in Egypt and has to be cultivated.

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9- **Plantago ovata Forssk.**, Fl. Aegypt.-Arab, 31 (1775)

Plantago decumbens Forssk, Fl. Aegypt.-Arab, 30 (1775).

Arabic : *Geneima* جنيمة

Qurayta قريطة

English : Spogel plantain.
French : Ispaghula.
German : Spogelwegerich.

Morphological Description:

A stemless annual herb, about 5-15 cm high, with linear-lanceolate, acute leaves. The leaves taper at base to a petiole. The leaves are densely pubescent to villous giving the plant a silky appearance. Spikes, dense, ovoid to cylindrical, 0.8 -3 cm long, 0.5-1 cm wide, on scapes shorter than or slightly exceeding the leaves. Bracts, glabrous, obovate, obtusish, equalling the calyx, broadly white-scarious margined.Sepals glabrous, elliptic, obtuse, scarious-margined, weakly keeled above. Corolla lobes, glabrous, obovate, mucronate. The petals are broadly lanceolate with brown centre. Capsule ellipsoid, dehiscent near the middle, ca 3 mm long. Seeds, 2, oblong, plano-convex and boat-shaped with the flattish side hollowed, brown, 2.3-3 mm long.

Distribution

Local : It is of common occurrence in Mediterranean coastal region, Sinai proper, Isthmic desert and Arabian desert East of Nile.
Regional : All the North African countries.
Global : Many countries of the Arabian Peninsula, and the Indian subcontinent.

Status :

The plant grows in sandy habitats in deserts of the Arab countries. Its appearance and prosperity are affected with the irregular rainfall. Therefore, there is a great need to cultivate this plant in sandy soils to be sufficient for the needs of the market. This has been tried once in Egypt since three decades. It has been successful and needs to be repeated.

Part Used:
The seeds known as:

Arabic	:	*Bizr Qatouna*	بذر قاطونة
English	:	Ispaghula seed, Indian Plantago seed, Spogel seeds	
French	:	Ispagul	
German	:	Indische Flohsamen, Indisches Psyllium.	

Description:
The oval, boat-shaped, 1.5-3.5 mm long seeds vary considerably in colour from pale pink to greyish brown and even reddish yellow. On the convex surface, there is a reddish-brown oval fleck, while the concave surface is grooved and has a distinct scar (hilum). When placed in water, the seeds swell rapidly and become surrounded by a colourless, transperent layer of mucilage. Taste: bland and mucilagenous.

Constituents:
- Mucilage (20-30%) located in the epidermis of the testa. It consists of up to 85% weakly acidic arabinoxylans with a small proportion of rhamnose and galacturonic acid.
- Fixed oil
- Protein
- Iridoids

Pharmacopoeias

DAB 10	US Pharmacopoeia XXII
British Pharmacopoeia	BHP

Folk Medicinal Uses:
Seeds are used as demulcent, diuretic, as poultice on boils and ulcers, as cosmetic for hair.

Seeds are taken with abundant fluid as laxative because of their considerable swelling power. The dilation stimulus caused by the ensuing increased volume of the intestinal contents leads to defaecation; the mucilage facilitates the smooth passage of the intestinal contents. The drug is contraindicated in cases of intestinal obstruction.

Actions and Uses:
Oral intake of *P.ovata* seeds adapts the clonic flora to increase the production of butyrate (or acetate) from the dietary fiber and increased faecal concentrations of butyrate by 42% in patients resected for colonic cancer. The seeds regulate or

moderate the colon motility and enables a physiological balance of the colonic transit.

Plantago ovata seeds taken to control bowel function was found a useful supplement in weight control diets as it affects fat intake and may have some effect on the subjective feeling of fullness.

Plantago ovata seeds were found to decrease serum cholesterol, mainly LDL cholesterol, through enhancing cholesterol elimination as faecal bile acids.

Doses: *ca* 10 g preswollen with ca 100 ml water are taken morning and evening followed by drinking at least 200 ml water.

Adulterants and Substitutes:
The seeds of other *Plantago* species which can be differentiated by their colour and swelling factor.

Phytopharmaceuticals in the Egyptian Market.
Laxiplant (**Schwabe**) and
Rgiolax (**Madaees, CID**)

Authentication:
1- **Swelling Index:** not less than 9%.
2- **Foreign Organic Matter:** not more than 3%.
3- **Loss on Drying :** not more than 10%
4- **Ash:** not more than 4%
5- **Acid-insoluble ash:** not more than 1%

Storage:
Protected from light. The comminuted drug should not be kept longer than 24 hours.

Cultivation:
P. ovata seeds can be obtained from the desert in March of the rainy years. The same holds true with *P. albicans*, which grows in the Mediterranean coastal zone. *P. albicans* was tried by the senior author to be cultivated in the land where Bedouin cultivate barley. In a piece of land at Sidi Abdel Rahman area, the *P. albicans* seed, already collected from the same area, were sown instead of barley. The crop was promising and it is recommended to repeat it, especially in view of the degradation of habitats supporting the naturally growing plants.

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10- **Senna alexandrina Mill.**, Gard. Dict., Ed. 8, no.2 (1768).

Cassia senna L., Sp. Pl ed. 1,377 (1753).
Cassia lanceolata Forssk., Fl. Aegypt.- Arab,85 (1775).
Cassia acutifolia Delile, Mem. Egypte 3: 316 (1802).

Arabic	:	*Sana*	سنا
		Sana makki	سنامكى
		Sana hindi	سنا هندى
		Sana hegazi	سنا حجازى
		Salamekki	سلامكى

English : True senna, Alexandria senna.
French : Cassia Sen.
German : Senna Cassie
Italian : Sena Alessandrina

Morphological Description :
A perennial glabrous under-shrub with compound paripinnate leaves. The leaflets are lanceolate with acute margin with the upper surface glabrous or almost so and the lower more or less densely pubescent. The flowers are yellow and arranged in a raceme. Pods flat, shortly falcate-oblong, pubescent when young and glabrous with age (Plates 12 & 13).

Ecology:
C. senna is a common perennial in the southern part of the Eastern Desert and is rare in the northern part. It is one of the most extensively collected desert species as it is a famous medicinal plant. Its distribution and density are probably influenced by the intensity of collection by man.

Dominance of *C. senna* is usually seen in Wadi Abbad and in affluents of the two principal tributaries of Wadi El-Kharit. The plant cover of this community ranges between 5% and 15 % contributed mainly by *C. senna*. *Acacia ehrenbergiana*, *Aerva javanica* and *Zilla spinosa* are the common associates. Other associates are *Acacia raddiana*, *Cassia italica*, *Chrozophora oblongifolia*, *Fagonia parviflora*, *Farsetia ramosissima*, *Morettia philaena*, *Panicum turgidum*, *Polycarpaea repens* and *Stipagrostis plumosa*. Ephemerals include *Arnebia hispidissima*, *Astragalus eremophilus*, *A. tribuloides*, *Euphorbia granulata* and *Zygophyllum simplex*. The

ephemerals enrich the ground layer which, like the frutescent layer, is usually thin. The suffrutescent layer is the most notable.

C. senna is a widespread xerophyte within the Nubian Desert. In Wadi Allaqi the plant cover of this community ranges from 5 % to 25 %. Of the three layers, the shrub layer is thin and includes two common associates, *Acacia ehrenbergiana* and *A. raddiana* together with the less common *A. tortilis* and *Balanites aegyptiaca.* The suffrutescent layer is well developed as it includes the dominant together with the common associate *Aerva persica* and the less common *Crotalaria aegyptiaca, Dipterygium glaucum, Francoeuria crispa, Heliotropium arbainense, Panicum turgidum, Salsola baryosma, Solenostemma argel* and *Stipagrostis plumosa.*

Distribution:

Local : The south eatern desert of Egypt, Red Sea region, Sinai and Gebel Elba.

Regional : Egypt, Libya and Algeria

Global : Central Sahara to Arabia and India, Sudan along the Red Sea coast to Somalia and southwards to Kenya.

Status :

The wild plants are overexploited and collected to be sold in the market for its folk medicinal uses. Cultivation of the plant is important. It could be cultivated in the marginal land with limited water resources.

Part used :

a- Senna leaf b- Senna fruit (Plate 12).

a- Alexandrian Senna leaf :

Arabic : *Sana makki* سنامكى

English : True senna, Alexandria senna

French : Cassia Sene

German : Senna Cassia

Italian : Sena Alessandrina

Turkish : Sinameki

Description:
Senna leaf is the dried leaflets of the paripinnate leaf of *Cassia acutifolia* Delile, Known as Alexandrian or Khartoum Senna, and of *Cassia angustifolia* Vahl, known as Congo, Tinnevelly or Indian Senna.

Senna leaf contains not more than 8.0 *per cent* of Senna stalk (stems and rachis) and not more than 2.0 *per cent* of pods or of other foreign organic matter, and yeilds not less than 2.5 *per cent* of hydroxyanthracene derivatives calculated as sennesoid B.

Macroscopical: Odour, faint and characteristic; taste, mucilagenous, slightly bitter and acrid.

Alexandrian Senna: Leaflet, entire or frequently broken; with very short petiole, about 1 mm long. Lamina, lanceolate to ovate seldom exceeding 4 cm. and 4 mm to 15 mm broad; pale greyish-green base, asymmetric; margin, entire and slightly revolute; both surfaces, very slightly hairy; venation, pinnate-reticulate; the venis, about 60, and anastomosing by small arcs forming a ridge near and parallel to the margin.

Constituents :
The chief active constituents of Alexandrian senna are glycosides derivatives of anthracene. Two of these are named sennoside-A sterioisomers of the dianthrone of rhein. Small amount of free aloe emodin and rhein also occur. Other constituents are kaempferol, myricyl alcohol and a phytosterol, mucilage and calcium oxalate.

Indian senna also contains similar active constituents as alexandrian senna.

Substituents and adultrants :
- *Cassia obovata*, upper Egypt (Dog senna).(=*Senna italica*)
- *Cassia angustifolia*, Southern Arabia (Arabian senna).
- *Cassia angustifolia* in Arabia (Mecca or Bombay senna).
- *Cassia auriculata* (Palthe senna).
- *Cassia holosericea*.
- *Cassia montana*.
- Argel leaves, *Solenostemma arghel*.
- *Tephrosia apollinea*.
- *Colutea arborescens*.
- *Ailanthus glandulosa*.
- *Globularia alypum*.
- *Coriaria auryrtifolia*.

Uses :

Senna is a stimulant laxative used for treatment of constipation and for bowel evacuation. It is usually effective within 6 to 12 hours. Adverse effects include gastro-intestinal disturbances.

It stimulates the muscular coat of the intestine and produces purgation which is not followed as is commonly the case, by constipation. It is therefore one of the most useful of purgatives, especially in cases of habitual constipation.

For the treatment of constipation, senna is usually adminstered as tablets, granules or syrup. In the UK the usual adult dose is the equivalent of 15 to 30 mg of total sennosides given as a single dose at bedtime. Dose up to 50 mg are given in the US. Children over 6 years of age have been given one-half the adult dose.

Doses :

0.5g to 3.0 g.

b-Alexandrian Senna fruit : Leaf-like, flat and thin pods, yellowish green to yellowish brown with a dark brown central area, oblong or reniform. Length, about 40-50 mm; width, 20-25 mm; stylar point at one end, containing ridges on the testa.

Constituents.

Senna leaf contains not less than 2.5% of hydroxyanthracene derivatives (Alexandrian) and not less than 3.4% of hydroxyanthracene derivatives (Tinnevelly) calculated as sennoside B.

The chief active constituents of Senna drug are glycosides derivatives of anthracene. Two of these are named sennoside-A and sennoside-B which are combination of rhein. Small amount of free aloe-emodin and rhein, a phytosterol, mucilage and calcium oxalate.

A new anthraquinone glycoside (emodin, 8-O-sophoroside), 7 known glycosides and two aloe dianthrone diglucosides were isolated from the leaves of *C. angustifolia*.

Two naphthalene glycosides were isolated from senna leaves and pods; namely: 6-hydroxymusicin glucoside from *C. acutifolia* and tinnevellin glucoside from *C.angustifolia*. Both compounds can be utilized to distiguish between the two species.

Volatile constituents (0.047% based on dry weight) was obtained and analysed by GLC and GLC-MS. More than 200 compounds were detected. The occurrence of menthol, geranylacetone, anethole is of interest.

Pharmacological Actions and Indications:

Senna is an anthraquinone stimulant laxative used for treatment of constipation and for bowel evacuation. It is usually effective within 6-12 hours, adverse effects include gastrointestinal disturbances.

Senna may cause mild abdominal discomfort such as colic or cramps. Prolonged use or overdosage can result in diarrhoea with excessive loss of water and electrolytes, particularly potassium. Senna should not be given to patients with intestinal obstruction or with undiagnosed abdominal symptoms.

There is some absorption of anthraquinone laxatives following administration by mouth. Senna preparations are hydrolyzed in the colon by bacteria to release the active free anthraquinones. Excretion occurs in the urine and the feaces and also in the other secretions including breast milk. Senna is usually administered as tablets, granules and syrups. The usual adult dose at bedtime.

The water-soluble polysaccharide isolated from the leaves of C. *angustifolia* showed antitumor activity against the solid sarcoma-180 in CD1 mice.

Hot glycerin extract of C. *angustifolia* showed virucidal activity against Herpes simplex virus. This activity is due to the anthraquinone content.

Authentication :

1- Macro- and microscopically following E.P 1984.
2- Foreign organic matter not more than 2%.
3- Senna stalk not more than 8% in leaf and 2% in fruits.
4- Hydroxyanthracene content not less than 3.4 % in leaf and 2.5 % in fruit.

Pharmaceutical preparations in Egyptian Market :

- Sennalax Tablets (purified calcium salt of extract,20mg/tablet) **(Nile)**
- Mucinum Tablets **(Amriya Pharm. Ind.)**
- Laxative tea bags preparation. **(Mepaco)**
- Intestinal tea bags preparation. **(Sekem)**
- Eucarbon, **Sedico**

References:

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activity of water-soluble polysaccharides from C. *angustifolia* leaves. Planta Med. **55**(6): 536-539.

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Cassia obovata Collad, Hist. Nat. Med., 92 (1816).
Cassia italica (Mill). F.W. Andrews, Fl. Pl. Anglo-Egypt. Sudan, 2: 117 (1952).

Arabic	:	*Sana mekki*	سنامكى
		Sala mekky	سلامكى
		Ischrik	عشرق

English : Senna
French : Senne

Morphological Description:
Erect to ascending-spreading branched shrublet with blue-green foliage; to ca 1 m high Leaves, paripinnate with 3-6 pairs of oblong to obovate, obtuse, mucronate leaflets which are 1.5 to 3 cm long, 1-2 cm wide, sometimes unequal at base, on petioloules ca 1 mm long. Flowers racemed, on pedicels 3-5 mm long; petals, yellow with darker veins, 1-1.7 cm long. Pod flat, curved-oblong, 3-5 cm long, 1-1.8 cm wide, obtuse, minutely pubescent to glabrescent, with a transverse series of creases and a longitudinal series of short crests on face (Plate 13).

Ecology:
The plant grows in habitats sometimes similar to that of *Senna alexandrina*. However, the geographical amplitude of **Senna italica** in Egypt is wider. It grows in sandy habitats.

Distribution :
Local : All over the deserts of the country, especially the eastern desert, Red Sea region, Sinai and Gebel Elba.
Regional : Egypt, Libya, and Algeria.
Global : North Africa from Cape Verde Is. to Egypt, extending south to Nigeria, Sudan and Somalia, also in Arabia to S. Iran and Pakistan.

Status :
The plant is fairly common in its habitats. However, the disturbance of its habitat in addition to the collection of the herb have a great effect on the plant.

Constituents:
Ten flavonoids were isolated from the aerial parts including a new compound identified as tamarixetin (3-rutinoside-7-rhamnoside). Moreôver, b-sitosterol, stigmasterol, alpha -amyrin, 1,5-dihydroxy-3-methyl anthraquinone and a new anthraquinone were isolated.

Uses, Pharmacological Action and Indications:
More or less the same as *Senna alexandrina* Mill.

A new anthraquinone isolated from the plant exhibited antibacterial properties and inhibited tumor promotion induced by Agrobacterium tumefaciens.

Extracts of leaves and pods stimulate intestinal contractions with dose-dependent relation and this supports the purgative activity of the plant.

The ethanolic extract of the whole plant exhibited antiinflammatory, antipyretic, analgesic, antineoplastic and antiviral activities as well as prostaglandin (PG) release by rat peritoneal leukocytes. The ethanolic extract exhibited also CNS depressant properties, manifested as antinociception and sedation. It showed weak effect on writhing induced by acetic acid.

Toxicity:
Fresh shoots, leaves and fruits when given by stomach tube in daily doses of 0.5-10 g/Kg were equally toxic to sheep and goats. Clinical signs included diarrhoea, dyspenea,ataxia and anaemia.

Cultivation:
Planting date:
The proper time is springtime when the air temperature starts rising. It is not recommended to be later than April.

Soil:
Light sandy soils with good infiltration are the best for senna. Heavy soils are not preferred. Addition of manure's or other fertilizers is usually recommended.

Sowing :
Manual planting in leveled land, with 14 rows every 7 meters, at a distance of 30 cm. Mechanical planting, a planter or grain drill is used in rows 45 cm apart at a distance of 20 cm between the successive plants.

Sowing rate, per Feddan : Mechanical (planter) : Manual 5 - 6 kg seeds 8-9 kg seeds Seeds may be soaked in water for 12 hours before sowing to increase germination.

Herbicides :
Soil is sprayed with the herbicide triflan at a rate of 1 kg / Feddan before sowing. The land is ploughed after spraying and before sowing. This is not important in newly reclaimed land and where manure from cultivated land is not used.

Irrigation :
It is to be noted that senna is sensitive to water, e.g. it needs very little water. Sprinkler irrigation could be used with application every 5 days. after the establishment of the plant. Irrigation should be reduced after flowering. Excessive water causes chlorosis of the leaves and decreases the glycoside content.

Fertilizers :
It has been recommended to add per feddan :

500 kg Ca Superphosphate
200 kg Ammonium Sulphate
100 kg Potassium Sulphate

Foliar fertilizers could be used at a rate of 4 gm / liter, 200 liters / Feddan

Harvest :
It is possible to get three cuttings, the first about three months from sowing, the next one month later; harvest timing depends on the tillage and irrigation processes and fertilizers, etc. If inputs are reduced, the harvest may be reduced to two cuttings instead of three during the growing season.

The time of harvest depends on the drug to be used ; the leaves or the fruits; or both. In case of leaves, cutting would be 2 or 3 times, while in the case of fruits harvest generally is in July; daily picking of the fruits is required.

Yield:
One feddan would produce form 1 to 1.5 ton of dry fruits. In case of cuttings for leaves, one feddan produces from 1 to 1.5 tons of leaves mixed with fruits. The total glycosides in mature fruits range from 4.3 to 5.6 percent and in the dry leaves from 1.5 to 2.8 percent. Experiments showed that one feddan produces

from 750 to 1000 kg of air dry leaves, 2.5-3 ton of twigs and 350-400 kg of dry fruits.

Prices and values :

	Price	Value / Fd
1. One ton dry leaves (glycosides not less than 2.5 percent)	LE 1,700 - 2,000	1,000
2. One ton dry fruits (glycosides not less than 3.5 percent)	LE 2,500 - 3,000	1,000

International markets:

It is to be noted that India is the main producer of senna (5000 - 7000 ton per year); two thirds are leaves and the rest dry fruits. One must take into consideration that India is transferring its raw material into calcium-sennosides (about 50 ton of senna). This practice is to protect its production from senna.

The Sudan exports 10 percent of the market demands. Thailand exports about 70 ton every year to Germany according to a treaty.

The main consumers are Germany, Japan and USA. In the year 1982 the world market price of one kg of senna reached 2 £.

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12- **Silybum marianum (L.)** Gaertn. Fruct. Sem. Pl. 2:378 (1791)

Carduus marianus L. Sp. Pl., ed. 1, 823 (1753)

Arabic : *Qortom* قرطم

Harshaf barri حرشف برى

Shouk el-diman شوك الدمن

Shouk el-nasara شوك النصارى

Berber : Tataoura Doujnilourman.
English : Milk thistle, Holy thistle.
French : Chardon argente, Chardon marie, Artichaut sauvage.
German : Echte Mariendistel, the fruit is called: Mariendistel Fr¸chte.

Morphological Description:
Biennial or annual thistle, stout herb, up to 2 m high, almost glabrous. Stem, striate, branched. Leaves with spiny margins and characteristic white veins and spots. Basal leaves, very large, petiolate, forming rosettes, pinnatifid. Upper leaves, sessile, clasping, auriculate. Heads, large with spiny involucral bracts. Flowers, purple or white. Achenes have yellowish pappus. The fruit is about 6.7 mm long, *ca* 3 mm wide, and *ca* 1.5 mm thick (Fig. 6, Plate 14).

Ecology:
The plant is common on canal banks and in wet grounds , mainly in the Nile region. The soil supporting this plant is fine-textured and moist.

Distribution:
Local : Nile region, Oases, Western Mediterranean coastal region near the Delta.
Regional : All North African countries.
Global : Central and Southern Europe, Southern Russia, Asia Minor, North and South America, South Australia.

Status:
The plant is common in the Nile Delta. It is not seriously endangered. Trials to cultivate it were successful. The amounts needed for industry could be obtained by cultivation.

Parts Used:
The fruits without pappus, known as:

Arabic	:	*Qortom*	قرطم
English	:	Marian thistle, Milk-thistle.	
French	:	Fruit de chadron Marie.	
German	:	Mariendistel Früchte, Marien Körner, Frauendistel-Früchte.	
Latin	:	*Fructus Silybi mariae - Cardui mariae fructus.*	
		The fruit powder is yellowish brown.	
		The **herb**, known as:	
English	:	Milk thistle herb.	
French	:	Chardon Marie.	
German	:	Mariendistelkraut.	
Latin	:	*Cardui mariae herba.*	

Constituents

a-The fruits:

1.5-3% of a mixture of flavolignans known as silymarins consisting of: silybin, silychristin and silydianin, 3-deoxy-derivatives of silychristin and silydianin (= silymonin). Silyhermin, neosilyhermin A and B, 2,3-dehydrosilybin, tri- to pentamers of silybin. Taxifolin, quercetin, dihydrokaempferol, kaempferol, apigenin, naringin, eriodyctiol, chrysoeriol, 5-7,dihydroxy chromone, dehydroconiferyl alcohol. 20-30% fixed oil with a high proportion of linoleic acid (≈60%), oleic acid (≈ 30%) and palmitic acid (≈ 9%), 0.038% tocopherol, 0.63% sterols: cholesterol, campesterol, stigmasterol and sitosterol; ≈25-30% protein, some mucilage.

b-The herb:

Flavonoids: apigenin and its 7-O-glucoside, 7-O-glucuronide and 4,7-diglucoside, kaempferol and its 7/-glucoside and 3-sulphate, luteolin and its 7-glucoside, Sitosterol and its glucoside, a triterpene acetate, polyacetylenes, and fumaric acid.

Folk Medicinal Uses:

Herb, bitter appetizer, tonic, febrifuge, resolvent, antimalarial, emmenagogue and in disorders of uterus and spleen. Tincture from seeds used for liver disorders, jaundice, gall stones, peritonitis, cough, bronchitis, congestion of uterus and varicose veins.

Pharmacological Actions and Indications:

a- The Fruit

1. Silymarin competitively suppresses the action of hepatotoxic substances. Prophylactic administration is more effective than therapeutic administration after the liver damage has occurred. The demonstrated antihepatotoxic effect is explained by a ìmembrane-stabilizing actionî, probably through antioxidant and radical-scavenging actions.
2. Silybin increases the rate of synthesis of ribosomal ribonucleic acids through stimulation of the nuclear polymerase I which inforces protein synthesis and accelerates cell-regeneration processes.

The fruit as well as silymarin are indicated for the prophylaxis and treatment of liver damage caused by metabolic toxins, e.g., alcohol, tissue poisons, in liver dysfunction and after hepatitis, in chronic degenerative liver conditions, such as liver cirrhosis and fatty liver and in latent hepatopathies.

Studies revealed free radical scavenging and antioxidative properties of silybin complexes on microsomal lipid peroxidation. Silymarin was found to provide substantial protection against different stages of UVB-induced skin carcinogenesis, possibly via its strong antioxidative properties. Long-term treatment with silymarin was found effective on hyperinsulinemia, exogenous insulin need and malondialdehyde levels in cirrohsis diabetic patients. Silymarin retards collage accumulation in early and advanced biliary fibrosis secondary to complete bile-duct obliteration in rats.

b- The Herb:

Different from the fruit; as a cholagogue in supportive treatment of hepatic and biliary functional disorders. Data to substantiate these applications are lacking.

Authentication of the Fruit

1. Macro- and microscopically.
2. The drug must not smell or taste rancid.
3. Foreign vegetable and/or mineral matter, not more than 2%.
4. Loss on drying not more than 8%.
5. Ash: not more than 8%.
6. TLC test of identity entails detection of silymarin and taxifolin.
7. Silymarin not less than 1% calculated as silybin $C_{25}H_{22}O_{10}$ (Mr= 482.4).

For further information see DAB 10.

Pharmacopoeias :

Deutsches Arzneibuch 10. 1991

Phytopharmaceuticals in the Egyptian Market
1. Legalon tablets (CID by liscence from **Madaus** AG, Germany).
2. Silymarin granules (**SEDECO**).

Economic Potential:
The plant is and will continue to be of high economic potential for the widespread use of its flavolignans as antihepatoxic agents. Trials for cultivating the plant in farms in the Delta have been undertaken. Pilot experiments for the use of the fruits and the herb were done in some Egyptian pharmaceutical companies.

Cultivation:
The plant can be easily cultivated in the delta with achenes collected from the common wild plants along the canals.

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Fig. 6. ***Silybum marianum*** (L.) Gaertn
(After: Täckholm, 1974, Students' Flora of Egypt)

13- **Urginea maritima (L.) Baker**, J. Linn. London (Bot.) 13:221(1873)
Scilla maritima L. Sp. Pl. ed. l, 308(1753).
Squilla maritima Steinh.,Ann.Sc.Nat.Ser.2, 6:276 (1836).

Arabic	:	*Basal Faríon*	بصل فرعون
		Onsul, Onsel Onsul, Onsel	عنصل
		Basal el- far	بصل الفار
		Buseil; Basul	بصيل - باصول
		Samm el-far	سم الفار
		Ishkil	اشقيل

Berber : Ichkil, Isfil, Ikfilen, Lobsol bouchen, Ibsel idam.
English : Medicinal Squill, Sea onion, Squill.
French : Scilla maritime; Oignon marin, Scille.
German : Echtemerzwiebel.
Italian : Scilla marina, Cipolla marina Squilla, Pancrazio, Scilla d' Italia.
Turkish : Ada Sogani, Ansel, Yaban Sogani.

Morphological description:
A bulbous plant with rosetted leaves. The leaves appear at the beginning of winter. Leaves, basal, lanceolate to linear-lanceolate, 10-35 x 2-7 cm ,glabrous, margin smooth. Leaves become dry by the onset of summer and the plant becomes dormant for a period of 2-3 months depending on the climatic conditions as well as the soil moisture content. In August, or even one month later flowers appear. The bulb is huge (Plates 15 & 16), frequently white, or red, growing in clumps up to 70 together, each bulb more than 10 cm across and weighing more than 1 kg. Inflorescence, a long scape reaching 60 cm to 1.5 m high and carrying small flowers from the middle upwards. Red squill has longer and more stout scapes (1-1.5 m), while white squill has shorter ones (60 cm). Fruits are produced by the end of October. They are larger in red squill than in white squill. Seeds,1-4 in each fruit, minute, very light, compressed, oblong ca 3x7 mm and dark black-glossy coloured (Plates 14, 15 & 16).

U. maritima is a polymorphic species with various varieties and forms. Batanouny *et al.* (1970) reported that in Egypt there are three distinct morphological features collected from the different localities. The specimens collected from

Sidi Barrani along the western Mediterranean coast, show two features regarding the colour and size of the bulb. The average diameter of the bulb of white squill is 8.5 cm (Plate 16), while it reaches 17 cm in the case of red squill (Plates 15 & 16). On the other hand , in the specimens collected from the eastern Mediterranean coastal zone between El-Arish and Rafah, the bulbs have intermediate dimeter and their white tunics have reddish tinge. So, squills growing in Egypt show distinctive features regarding the morphology of their bulbs. One with moderate size and reddish tinge in the eastern coastal region, the second with white tunics and small size, while the third with dark-red tunics and very large bulbs. The latter two grow in the western Mediterranean coastal region , which extends westwards to the rest of the North African countries. It is noteworthy that the phytochemical screening showed that they are different regards their constituents. Taxonomical, ecological, phytochemical and cultivation studies should be undertaken on the three forms.

Ecology:

Habitat conditions:

The growth of *U. maritima* is confined to the coastal zone. It is not recorded in the inland desert. In a study in Sidi Barrani, along the western Mediterranean coast, it has been found that the white and red squills grow on soils with different physical and chemical properties. Soils supporting the white squill are shallower, more compact, with higher content of carbonates and soluble salts than those supporting the red squill. The soils supporting the red squill are of sandstone origin, while those supporting the white squill are of limestone origin.

The total plant cover of the community dominated by the white squill is about 60 percent; almost half of it is occupied by the squill. On the other hand, in the case of the red squill, the total plant cover is 68%, and the squill occupies about 90% of this cover.

The number of bulbs in 100 sq. m was found to be 430 in white squill and 250 in red squill, while the weight of these bulbs was 70 kg white squill and 123 kg red squill (Plate 15).

Distribution:

Local : The plant is of rare occurrence in the Mediterranean coastal region (Sidi Barrani Area) and the Isthmic Desert. In the latter region, it is found in maritime sand as well as in stony grounds and ascending hills.

Regional : All North African countries

Global : Mediterranean region and the Canaries.

Status:

Recently, the plant has been subjected to severe uprooting and collection for pharmaceutical companies. It is now rare as compared with its status since thirty years. In a study by Batanouny *et al* (1970), it has been shown that a more or less equal number of bulbs would be established three years after collection. However, the weight of the newly established bulbs would be 13.7 kg compared to the 70 kg from a natural unharvested area (Plate 15). This confirms that the reestablishment of the squill will take numerous years even in the case of protecting the habitat after collection.

Conservation of this plant and its cultivation for further use by the pharmaceutical companies is essential. It is a very endangered species. The plant, being unpalatable, there is no fear to cultivate it in the coastal Mediterranean region without exclosure. Reseeding of the plant would be in the areas from which the bulbs were collected. One must consider that the collection of the bulbs is usually undertaken in late summer before flowering; at which time the active principles are at their highest level and in the meantime, the plants were not yet fruiting. This means that the soil will be deprived from the seed rain which enriches the seed bank.

Part used:

The dried fleshy scales of the bulb of *Urginea maritima* (L.) Baker. collected after withering of the leaves, known as:

Arabic : *Basal-ul-onsol* بصل العنصل

English : White Squill, Sea Onion, Squill.
French : Bulb de Scille
German : Meerzwiebel.
Italian : Cepa Marina
Latin : Bulbus Scillae, Scillae Bulbus, Scillae.

Description:

The scales are odourless or with a slight odour, and a mucilagenous, bitter, acrid and disagreable taste. They occur in irregular, curved, flattened narrow pieces, frequently tapering towards both ends; 0.5 to 5 cm long, 3 to 8 mm wide in the middle, 2 to 5 mm up to 8 mm thick; yellowish-white to pale yellow, somewhat translucent, exhibiting raised slightly darker points or lines, the vascular bundles; brittle when quite dry, tough and flexible when moistened; fracture, short. The transverse cut surface shows a line of prominent vascular strands near the concave edge and numerous small strands scattered in the mesophyll.

Constituents:
It contains 0.2- 0.4% bufadienolides, comprising about 41 bufadienolides. Main glycosides are proscillaridin A (0.005 - 0. 05%), scillaren A (ca. 0.6%) and glucoscillaren A (ca. 0.05%). Sclliglaucoside (0.07 %), scillaphaeoside (0.04 %), 9-hydroxyscilliphaeoside and scillacyanoside (0.05 %) are minor constituents.

The leaves of *U.maritima* contains vicenin-2, vitexin, isovitexin, orientin and isoorientin as well as sinistrin, a fructan polysaccharide.

The highest growth rate, carbohydrates, reducing sugars, scillaren A and B contents were observed when bulblets of *U.maritima* were planted in 40-cm pots containing sandy soil and irrigated 7 times each 0.5L/pot per year.

Folk Medicinal Uses:
White squill bulbs are applied fresh for treatment of wounds and tumours, expectorant in bronchitis, chronic catarrh and pneumonia. In strong doses, emetic, cathartic and upsets nerves. Fresh bulb is vesicant, rubefacient, anthelmintic, useful for rheumatism, oedema and gout. Its cardiac action is like that of *Digitalis*, slowing down the pulse and increasing its strength, emmenagogue, abortive, aphrodisiac. Dried powdered bulbs made into tablets, sucked slowly in the mouth against internal tumors. Infusion of dried bulb is a strong purgative. Aqueous infusion of the fresh bulb is used for treatment of diabetes. A piece (2g) of fresh fleshy leaves, boiled in a glass of water. Cool and drink every morning for 45 days(Matrouh). For treatment of painful joints: A slice of red squill is warmed in direct heat then placed on the joint after painting it with cooking oil 3 times day over a period of 45 days(Matrouh).It is reported to be used by ancient Egyptians in dropsy.

The bulb extract is usually used as an expectorant if small doses were taken, in large doses it is usually used as an emetic. The Frontier soldiers usually use it as an emetic when one has some food poisoning. The plants are also used for curing dermal fungal infections.

In the Eastern Mediterranean zone in Egypt (El-Arish- Rafah zone), the plant was used as territory marker. This practice was also recorded in Libya. However, these days, it is difficult to find such markers in Egypt.

Pharmacological Actions and Indications:
Bufadienolides of squill accelerate the heart beats in small doses, thus increase the volume of blood pumped through the heart. They increase diuresis due to dilatation of the capillaries of the kidneys as well as through increased volume of blood passing through kidneys. They also have an antitussive action in treatment of cough due to their poor absorption from the gastrointestinal tract and their mild gastric irritation causing a reflex secretion from the bronchioles

Dose: 0.06 to 0.50 g. In large doses, it causes vomiting.

Toxicity:

The plant is poisonous. Dose should not be exceeded. Toxicity due to ingestion of 2 bulbs of *U.maritima* as a folk remedy for arthritic pains by a 55-years old female was reported. Symptoms shown were cardiac glycoside intoxication which included nausea, vomiting seizures, hyperkalaemia, atrioventricular block and ventricular arrhythmias resembling digitalis toxicity. The patient died 30 hours after ingestion.

Authentication:

Squill contains not more than 2.0% of foreign organic matter. It contains no slices of red, pink or purplish scales of red squill, Alcohol extractives not less than 65. 0%, ash not more than 6.0%, acid - insoluble ash, not more than 2.0%. It should be stored in well-closed containers, in a cool dry place protected from light.

Substitutes:

Indian squill:

It consists of the dried longitudinally sliced, bulb of *Urginea indica* (Roxb.) J. P. Jessopp. It is used as cardiotonic, in small doses as an expectorant.

Adulterants:

Red squill:

It is the red variety of *Urginea maritima*. It is distinguished by the reddish brown outer scales and the white to deep purple inner ones. In addition to the cardio-active glycosides, the bulb of red squill also contains scilliroside and scillirubroside. It is used as rodenticide.

Pharmcopoeias:

Egyptian Pharmacopoeia, 1984.
British Pharmacopoeia 1988.

Phytopharmaceuticals in the Egyptian market:

The following pharmaceutical forms are used:

Fresh bulbs, Dried scales, Tincture squill, Compound squill linctus, Liquor pro tincture squill, Squill elixir, Pediatric opiate squill linctus, Squill oxymell, Squill liquid extract, Squill vinegar, Squill pastilles. Scillaren, 0.5 mg / ml ampoule (**Sandoz**), 0.8 mg tabelt (Sandoz), 0.8 mg /ml drops (**Sandoz**). Palmocadil syrup: Tr.Scilla 9 ml / 120 ml (Nile). Cosylan syrup: Fluid ext. of Squill 2ml/4floz (**Park Davis**). Lobestra syrup: Tr. Scillae 0.5 ml /200 ml.(**Nile**). Expectyl syrup ;Tr. Squill 2 ml / 100 ml (**Adco**). Broncho cough syrup: Tr.Scillae 3ml / 100 ml (**Mepaco**).

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Plate 1



Wild medicinal plants in Egypt

Plate 2

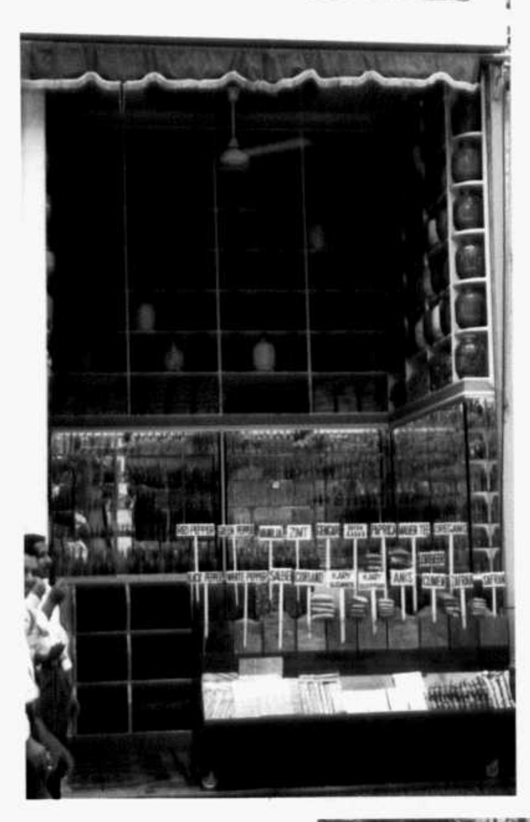


Drugs in the stores in Aswan, Egypt



Drugs in the stores in Mendoza, Argentine

Plate 3

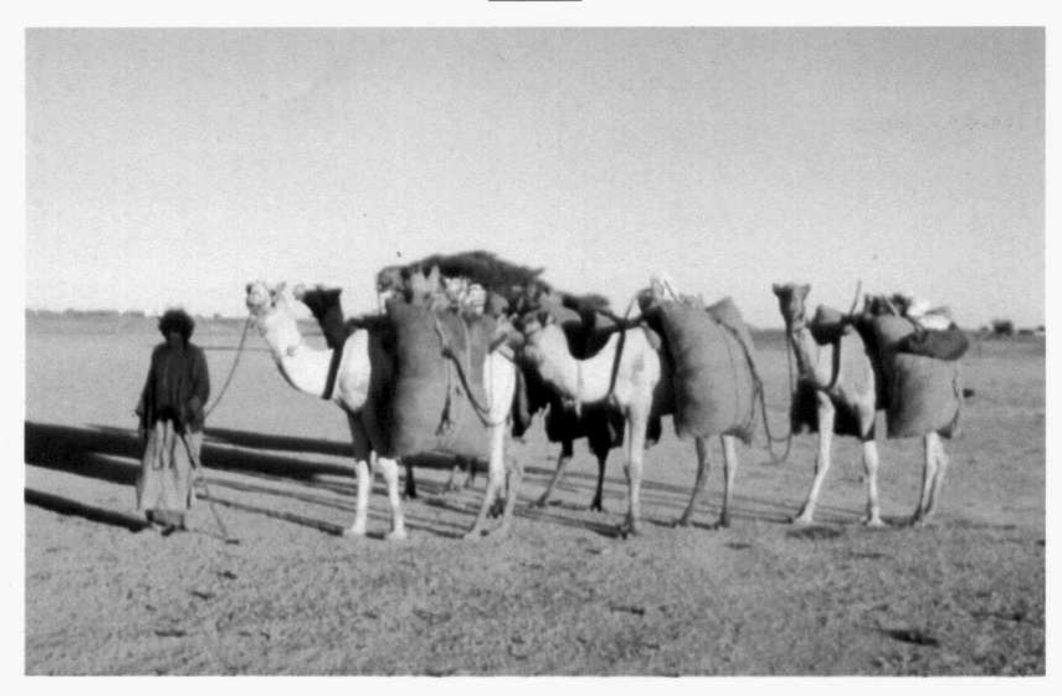


Attar shop in Aswan, Egypt



Healer selling the drugs in the street, Amriya, near Alexandria

Plate 4



Transport of medicinal herbs by camels in the south eastern desert, Egypt



Packing *halfbarr* (***Cymbopogon schoenanthus***) for transportation

Plate 5



Khella shitani (***Ammi majus*** L.)

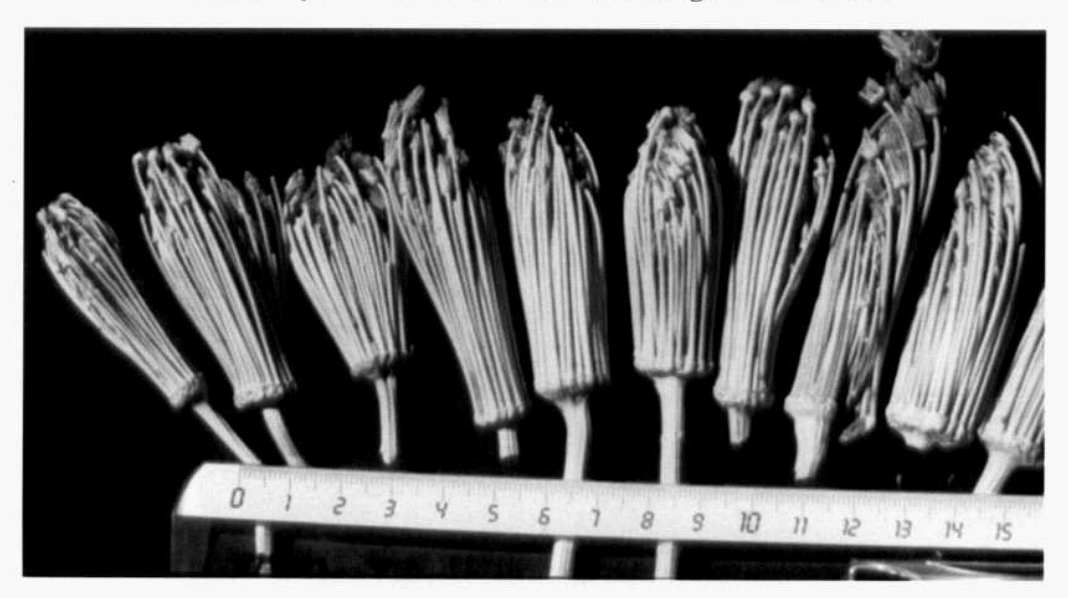


Khella baladi (***Ammi visnaga*** (L.) Lam.)

Plate 6

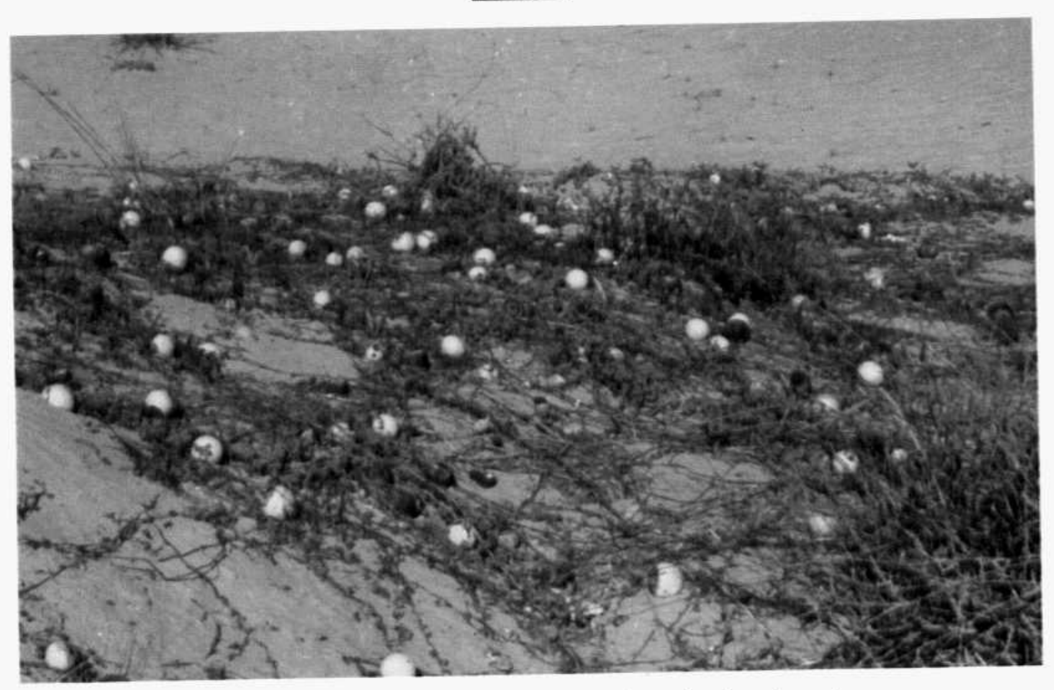


Mature dry inflorescences of ***Ammi visnaga*** in the market



Mature dry inflorescences of ***Ammi visnaga***

Plate 7

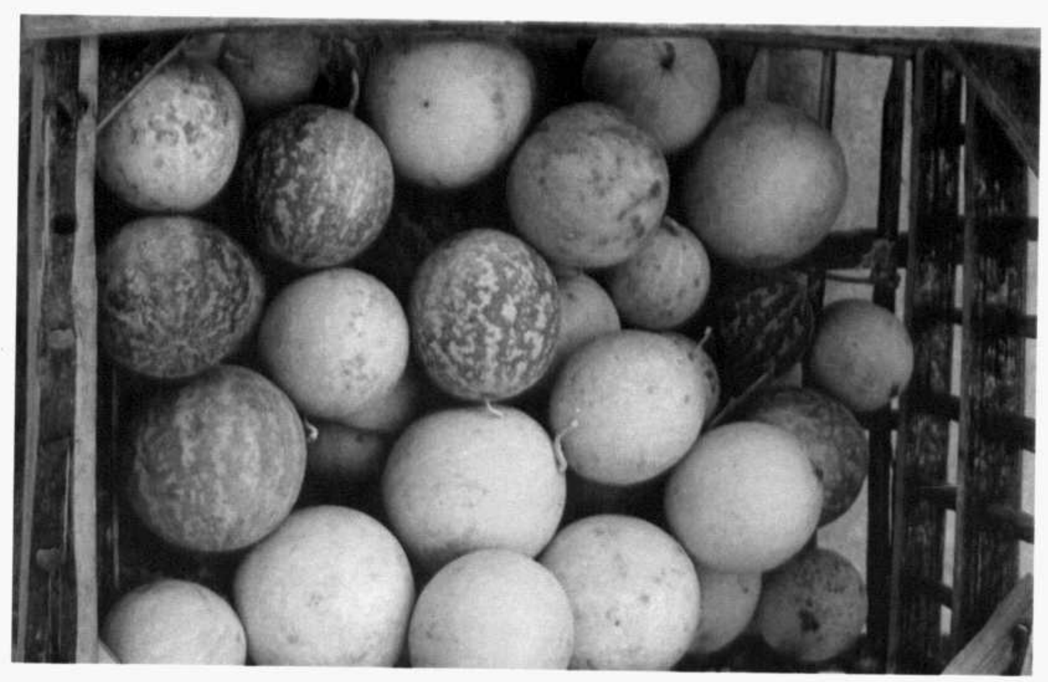


Fruiting *Citrullus colocynthis* plant in the desert



Ripe fresh fruits of *Citrullus colocynthis*

Plate 8



Fruits of ***Citrullus colocynthis*** for sale along the road from Alexandria to Matruh



Flowering ***Datura stramonium***

Plate 9



Fruit of *Datura stramonium*



Glycyrrhiza glabra plant

Plate 10

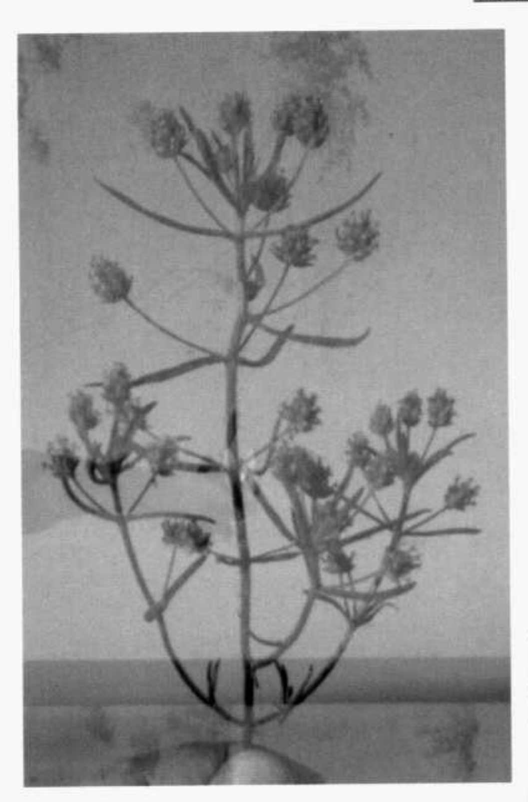


Hyoscyamus muticus growing in Sinai



Flowering branch of ***Hyoscyamus muticus***

Plate 11



Plantago afra herb



Plantago lanceolata herb

Plate 12



Senna pods in the *attarin*



Senna pods

Plate 13



Fruiting branch of ***Senna alexandrina***



Flowering branch of ***Senna italica***

Plate 14



Inflorescences of ***Silybum marianum***



Cultivated ***Urginea maritima*** (leafy stage) in an experiment at El Omayed, west of Alexandria

Plate 15

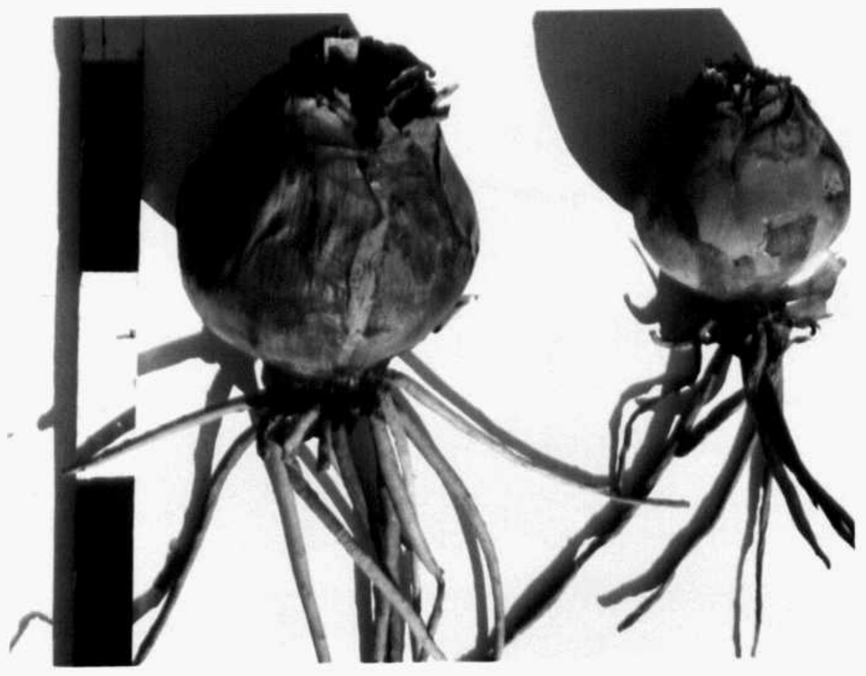


A bulb of the red variety of ***Urginea maritima***

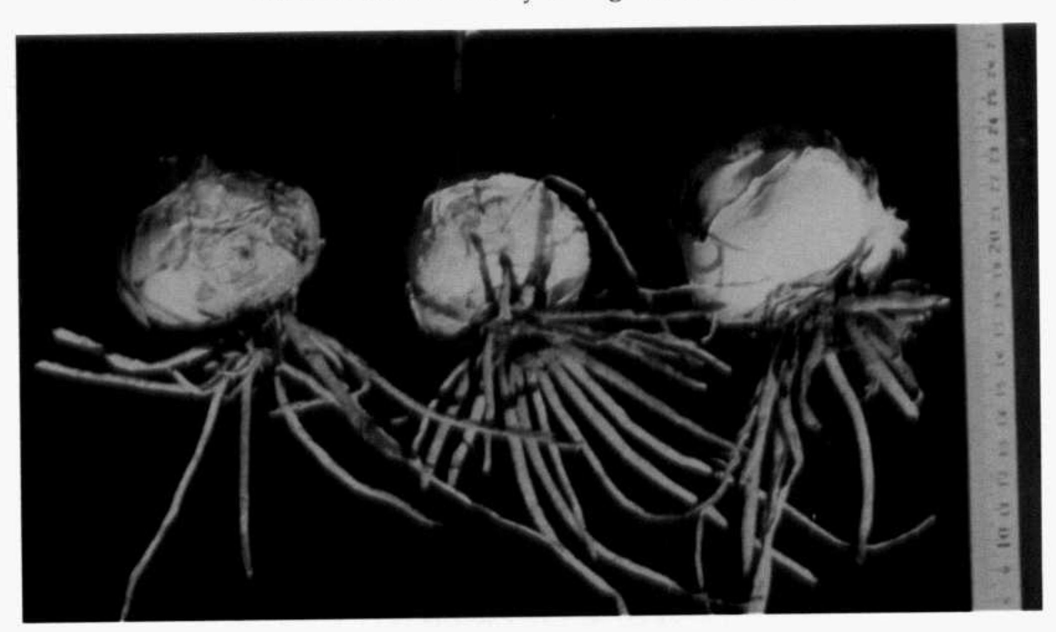


The bulbs of the red variety of ***Urginea maritima*** collected from 100 sq.m. in Sidi Barrani, the north western coastal zone (September 1969).

Plate 16



Bulbs of the red variety of ***Urginea maritima***



Bulbs of the white variety of ***Urginea martitima***

Chapter Three

WILD PLANTS USED IN FOLK MEDICINE

There are numerous plant species which are collected from their natural habitats to be sold in the "*Attarin*" or the herb's seller shops. This practice has been adopted since immemorial times. The long list of plants and drugs obtained from them is given by numerous scholars as **Ibn Sina** "Avicenna", **Ibn El Beitar**, **El Baironi**, **Al Antaki**, **Al Mo'tamed** and many others. It is interesting to mention that some of these books give the names of the plants in different languages, its geographical distribution, its habitat, its growth form, the part used in medicine, how it is used, how it is stored, how it is used as a single drug or a compound with other drugs, and its effect on the different organs of the body.

The great surge of public interest in the use of plants, as well as some animal products as medicine is based on the assumption that the plants will be available on a continuing basis. However, no concerted effort has been made to ensure this in the face of the threats posed by the increasing demand of vastly increasing human population and extensive destruction of plant rich habitats.

The continuous use of these plants impose a considerable pressure on the naturally growing plants in the deserts and semi-deserts of the region. In such habitats, the rate of exploitation is more than the rate of establishment of new individuals under the harsh environment of the desert. Therefore, it is expected that many of these plants are endangered. One notes that little attention has been paid to the socio-economic and conservation aspects of medicinal plant resources. This is probably due to the relatively small volume involved and the special nature of the informal trade in these plants. However, there is a great need to possess information on these plants to help the assessment of the economic value of them and manage their traditional use.

Monographs of some of the wild plants used in folk medicine are given below. It is to be noted that the given list does not cover the plant species used in folk medicine. The popular ones have been chosen.

1. **Acacia nilotica (L.)** Delile Descr.Egypte, Hist.Nat. 79 (1814)
Mimosa nilotica L., Sp.Pl., ed. 1, 521 (1753).

Arabic : *Sant* سنط

Fruit : Qarad
English : Egyptian Acacia, Egyptian Thorn
French : Acacia d'Egypte, Gommier d Egypte
German : Aegyptische Akazie
This has been known since the greek times as the Egyptian akakia
(**Arabic:** *Aschawkah Al misriyah*) الشوكة المصرية
(**English:** Egyptian thorn)

Morphological Description

Tree, 2.5-14 m high; bark on trunk tough, fissured blackish grey or brown, powdery and peeling; young branches from almost glabrous to subtomentose; stipules spinescent up to 8 cm long, straight or almost so often deflexed. Leaves, up to 7.5 cm long, with 2-11 pairs of pinnae, often with 1 or 2 petiolar glands and others between all or only the topmost of the pairs of pinnae, leaflets 7-25 pairs, 1.5-7 mm long, 0.5-1.5 mm wide, glabrous to pubescent. Flowers, bright yellow in axillary heads, 6-15 mm in diameter; peduncle, 1-3 cm long. Calyx, 1-2 mm long, subglabrous to pubescent. Corolla, 2.5-3.5 mm long, glabrous to pubescent outside. Pod, indehescent lomentum, constricted between the seeds, straight or curved, glabrous to grey-velvety, 8-17 cm long, 1.3-2 cm wide. Seeds, deep blackish-brown, smooth, subcircular, compressed, 7-9 mm long, 6-7 mm wide (Plate 17).

Ecology :

The plant grows on the banks of the canals crossing the Delta and the Nile Valley (Plate 17). It was cultivated in some cases. However, its cultivation is stopped. The relicts of this species are occasionally seen along the canals near the River Nile.

Distribution:

Local : The Nile Delta, Nile Valley, Oases, Sinai and Western Desert.
Regional : Egypt
Global : Egypt, Sudan and some Nile basin countries. However, there are different subspecies which occur in different countries as India, Senegal, Kenya, and Tanzania. Some of these sbspecies are used in afforestation in the desert areas in the Arab Gulf countries, e,.g. *A. nilotica* subsp. *indica* in Qatar.

Status :
The *Acacia* groves growing in the Nile region in Egypt were replaced since many centuries by the date palm groves. Despite this, the tree was reputed for its value as a source for the agricultural tools as the hoe, the plough, ..etc. Due to the introduction of the mechanisation of agriculture, the plant was neglected. Also, due to the need of the land occupied by the trees, they were fell down. Nowadays, the tree is not as common as before. It could be considered as endangered, especially it does not grow in many countries.

Part Used :
The fruits, the bark and the leaves.

Consituents :
a- **The fruits** : They contain high percentage of phenolic constituents, which consist of : m-digallic acid, gallic acid, its methyl and ethyl esters, protocatechuic and ellagic acids, leucocyanidin, m-digallic dimer 3, 4, 5, 7-tetrahydroxy flavan-3-ol, oligomer 3, 4, 7-trihydroxy flavan 3, 4-diol and 3, 4, 5, 7-tetrahydroxy flarvan-3-ol, and (-) epicatechol. The fruits contain also: mucilage, and, saponins.
b- **The bark** : It is rich in phenolics consisting of condensed tannin and phlobatannin, gallic acid, protocatechuic acid pyrocatechol, (+) - catechin, (-) epigallocatechin-7-gallate, and (-) epigallocatechin-5, 7-digallate.
c- **The leaf** : It contains apigenin, 6-8-bis-D-glucoside, and rutin.

Folk Medicinal Uses :
The fruits are given for diarrhae, haemorrhage, as sedative in labour, as a cure for sore gum and loose teeth and for diabetes by taking a teaspoonful before breakfast. The leaflets are chewn for nausea.

Pharmacological Activity:
- Acetone, alcohol and aqueous extracts of fruits and stem bark showed molluscicidal activity against *Bullinus truncatus* and *Biomphalartia pfeifferi*, the two snail hosts of Schistosoma.
- Extract of the bark showed antigonococcal activity as examined *in vitro* by filter paper assay method.
- Antihyperglycaemic activity.
- Stimulation of rat's uterus at different stages of sex cycle.
- Antimicrobial activity.
- Extract of *A.nilotica* blocked platelet aggregation in a dose-dependent manner using different agents. The antiplatelet aggregatory activity is mainly due to blockade of Ca^{2+} channels.

- *Acacia nilotica* extract showed an inhibitory effect on carrageenan induced paw edema and yeast-induced pyrexia in rats. It also produced a significant increase in the hot plate reaction time in mice. Analgesic and antipyretic activities may be attributed to the phenolic constituents present.
- Antimicrobial and molluscicidal activities had been ascribed to extracts of the plant.

Economic Potential :

The plant is of economic importance, due to its high content of polyphenolics to which the molluscicidal activity and tanning properties are attributed.

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2. **Achillea fragrantissima (Forssk.) Sch. Bip.,** Flora (Regensburg) 38:13 (1855).

Santolina fragrantissima Forssk., Fl. Aegypt.-Arab. 147 (1775).

Arabic : *Qaysûm* قيصوم

Baatharaan بعثران

Bu'aythiran بعيثران

Gesoom, Gesoum جسوم

Gesoom gebeli جسوم جبلى (سيناء)

English : Lavender Cotton
French : Garde-robe, Aurone femelle, Santoline.
Italian : Cypressengarbe.
Turkish : Guarda roba, Santolina.
Sarvi otic, Kara-pelin otu.

Morphological Description :
Plants are white-wooly, with erect stems which attain up to 1m high. Leaves small, exstipulate, thick, white to greyish-green, oblong, serrate with undivided lamina. Flower heads, terminal discoid composed of numerous tubular florets with golden-yellow colour. Odour is aromatic and the taste is bitter (Plate 18).

Ecology :
The plant grows in the limestone wadis of the north eastern desert and in Sinai.

Distribution :
Local : The eastern desert, Red Sea region, Sinai Oases.
Regional: Egypt.
Global : The Arabian Peninsula.
Status : The plant is overexploited by collection for folk medicinal uses. It seems that the rate of exploitation exceeds that of regeneration. The plant may be considered endangered.

Part used :
Fresh or dry whole plant.

Constituents :
The fresh herb contains volatile oil that reaches about 1.0%, which consists of 59 components of which α-pinene, β-pinene, limonene, 1,8-cineole, linalool, carvacrol, eugenol, artemesia ketone, palustrol, sabinene hydrate, α- and β-thujones, santolina alcohol and α-terpineol. Its tannin content reaches 8%. It is composed of resorcin, phloroglucin, methyl phloroglucin and pyrocatechol.

It contains, flavonoids, from which afroside, cirsimartin,chrysoplenol and cirsiliol were identified, also the fatty acids: lauric, myristic, palmitic, stearic, linoleic, linolenic and oleic, as well as a bitter substance named keissoside. Sesquiterpene lactones: 13-O-desacetyl-1-β-hydroxyafraglouclide and achilloide A were isolated. Also, taraxasterol and pseudotaraxasterol acetates were identified.

Folk Medicinal Uses :
An infusion of the dry, or fresh, flowering herb is used by the Bedouin for the treatment of cough, aromatic bitter stomachic, and anthelmintic.

Pharmacological Actions and Indications:
The volatile oil prepared from the flowering tops showed a broad spectrum activity against various microbes. 13-O-desacetyl-1-β-hydroxy-isoafragloucolide caused inhibition of phasic contraction and of the tone of rat isolated ileum, uterus and aorta. It increased the phasic contraction of isolated urinary bladder. Cirsiliol caused relaxation of contracted rats proximal aorta, trachea, urinary bladder and uterus.

Neither acute nor subchronic toxocity were noticed in mice with ethanolic extracts of *A. fragrantissima*.

References :

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3. **Adiantum capillus** - ***veneris*** L. Sp. Pl.; ed.1, 1096 (1753).

Arabic	:	*Kuzbarat el- bir*	كزبرة البير
		Sha r el- ard.	شعر الأرض
		Sha r el- banaat.	شعر البنات
		Sha r el- khanzir.	شعر الخنزير

English : Maidenhair, Venus s hair; Capillaire.
French : Adiante, Capillaire, Capillaire de Montpellier, Cheveux de vènus.
German : Frauenhaar, Venus haar.
Italian : Adiante, Capel-venere, Capovenere.
Turkisk : Baldirikara, Kinulcede.
Berber : Guengit, Rajraf.

Morphological Description :
It is a delicate perennial fern, with a creeping rhizome. The fronds are 5-35 cm long; the petiole and rachis are shiny black; the blade is 2 to 3 pinnate ovate to ovate- elliptic; pinnules are born on thin black stalks, fan-shaped, up to 7 cm long, without midrib, veins branched dichotomously. The sori are arranged on the veins of the secured area of the lobes of the pinnules.

Ecology:
The plant grows in moist habitats rich in organic matter. It occurs usually on the moist walls of wells and springs of fresh water.

Distribution :
Local : In almost all the phytogeographical regions of the country. However, it is confined to very moist habitats, especially the shaded ones.
Regional : All the North African countries.
Global : A cosmopolitan species.

Status :
Being rare and confined to particular shaded moist habitats, it is endangered in wild.

Part used :
The whole plant above the ground which is represented by the fronds.

Constituents :
Tannin, mucilage, gallic acid, bitter substance, hydrocarbons, sterols, triterpenes and coumarins.

Folk Medicinal Uses :
It is used as diuretic, emollient, demulcent, expectorant, tonic, febrifuge; for treatment of obstructions of the liver and spleen. Concentrated decoction of the fronds is used as emmenagogue.

Pharmacological Actions :
It has an estrogenic activity on female rats. It inhibited their uterine motility. Extracts prepared with petroleum ether showed estrogenic changes in menopausal women given through vaginal ovules. It caused significant decrease in FSH level and increase in SHBG. It stimulates the force of contractions of isolated duodenal strips in small doses, while high doses, cause complete relaxation.

Oral administration of extract of *Adiantum capillus-veneris* to male swiss mice improved glucose tolerance showing hypoglycaemic effect.

Large doses stimulate the rabbits' heart. It inhibits the growth of Strepotococcus pyogens, *Bacillus subtilis, Corynobacterium ovis, Aspergillus flavus, A. niger, A. fumigatus,* and *Trichophyton mentagrophytes in vivo.*

Dose: One table spoon of finely cut leaves to 1-2 cups of water or hot milk.

References :

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3- Kulaib, M.H.A. 1997. Clinical and biochemical study of the steroidal estrogenic and progestational extract of *Adiantum capillus-veneris* L. M.Sc. Thesis, Faculty of Medicine, Ain-Shams University, Cairo.
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5- Mohammed, W.M. 1995. Biological hormonal activities of *Adiantum capillus-veneris* L. extract in menepausal women. M.Sc. Thesis, Faculty of Medicine, Ain-Shams University, Cairo.
6- Neef, H.; Declercq, H.N. and Laekman,G. 1995. Hypoglycaemic activity of selected European plants. Phytother. Res. 9(1): 45-48.

4. Adonis dentata Del. Descr. Egypte, Hist. Nat. 287 (1813)

Arabic : *Zaghlil* زغليل

Nab el-gamal ناب الجمل

English : Adonis
French : Adonide
German : Adonis
Italian : Adonide
Turkish : Kan avci out

Morphological Description :
It is an annual herb, reaching up to 40 cm in height, with erect branched stem; which is hollow internally. Leaves, alternate, exstiputate, sessile, simple and tripinnatisect with linear lobes with a green colour, a slight odour and a bitter taste. The flowers are terminal, small, solitary, pedicellate, yellowish-orange in color. The fruit is an aggregate, terminal, solitary, more or less cylindrical, composed of 40-60 achenes, with dark green colour before ripening turning to brownish red on ripening. They have a bitter oily taste and a slight odor (Plate 18).

Ecology:
The plant grows in shallow, fine sandy loamy soils in the Mediterranean coastal zone of Egypt.

Distribution:
Local : Mediterranean coastal zone, the deserts, and Sinai.
Regional : Egypt and Libya.
Global : Arabia deserts.

Status :
The plant is fairly common in its habitats. However, it does not appear in years with low rainfall.

Part used :
The above-ground flowering and fruiting herb.

Constituents :

The herb contains cardenolide glycosides namely : adonitoxin, acetyl adonitoxin, vernadigin, strophanthin-(, and cymarin. The total cardenolides amounted to 0.158% in the flowering and fruiting herb of *Adonis dentata*. They amounted to 0.13% in the leaves; 0.15% in the flowers, 0.09% in the stems, 0.05% in the roots, and 0.06% in the fruits. It also contains adonitol (0.4%).

Folk Medicinal Uses:

Ibn El-Beitar mentioned the use of "Eyn el Diek", which is one of *Adonis* species, by the Indian kings to cause self pleasure, to prevent aging by preserving strength and youth and as an aphrodesiac. El-Antaky added that "*Eyn el diek*" prevents heart failure, oedema and enlargement of the spleen. He used the drug as tincture, liquid extract or sweetened infusion, mixed with coriander or the drug may be chewed. It is also reported in cough mixtures and cardiotonic preparations.

Pharmacological Actions and Indications :

The cardenolides of *Adonis dentata* are similar to those of *Digitalis* and *Strophanthus*. They stimulate the heart more rapidly with no cummulative effect. They are duiretic and neurosedative. The plant is toxic and should not be considered for self treatment.

References:

1- El-Kiey, M.A.; Sayed, M.D.; Abdel-Wahab, S.M. and Soliman, F.M. 1966. Investigation of the cardenolides in the different organs of *Adonis autumnales* L. and *Adonis dentata* Del. Growing in Egypt.Egypt. Pharm. Bull. U.A.R. **48** (6): 15-30.

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4- El-Kiey, M.A.; Sayed, M.D.; Abdel-Wahab, S.M. and Soliman, F.M. 1969. Comparative study of the colorimetric, chromatographic and biological methods of assay of *Adonis autumnale* L. and *Adonis dentata* Del. J. Pharm. Sci.; U.A.R. **10** (1) : 93-104.

5- Soliman, F.M. 1968. A Pharmacognostical study of certain *Adonis* species growing in Egypt. M. Pharm. Thesis, Faculty of Pharmacy, Cairo University, Cairo.

5. **Ambrosia maritima L.**; Sp. Pl.; ed. 1, 988 : (1753)

Arabic : *Demsisa* دمسيسة

English : Sea ambrosia
Oak of Cappadocia
French : Absinthe bätarde, Ambrosie
Ambroisie
German : Traubenkraut
Italian : Ambrosia, Ambrosia maritima
Turkish : Ambrozia, Amberiye
Yabani pelin, Ambrozia, Amberiye
Zaylan çiç

Morphological Description:
The plant is annual, hairy, much branched, 30-100 cm high . It has an aromatic odour and a slightly bitter taste. The stem is green, erect, solid, slender, striated with faint ridges. The leaf is simple, pinnatisect, petiolate, cauline, alternate and exstipulate, with ovate to triangular-ovate shape, with 3-7 lobes (Fig. 7, Plate 19).

Ecology:
The plant grows on the Nile and canal banks on the sediments from the Nile flood. After the construction of the high Dam and the lack of these sediments, the plant became rare. This threatens this species in addition to the continuous collection for folk medicinal uses.

Distribution:
Local : The Nile valley and the Nile Delta, Oases and the Medirerranean region.
Regional : Egypt, Libya, Tunisia and Algeria.

Status:
The plant is threatened due to the retreat of its habitat and the exploitation for folk medicinal uses. There is need for conserving this speies, both *in situ* and *ex situ*.

There is an ongoing project in Egypt to cultivte *Ambrosia maritima* to be used as molluscicidal under natural conditions.

Part used:
The above-ground flowering and fruiting herb.

Constituents:

The herb contains: Sesquiterpenes: ambrosin, damsin, farnserin, parthenin, hymenin, hymenolin, stamonin-b, anhydrofarnserin, chloroambrosin, desacetyl-dihydroconfertiflorin, neoambrosin, tetrahydroambrodamsin. Flavonoids: apigenin. Volatile oil: b-pinene, cineole, carvone, camphor, camphene, caryophyllene and dehydroanthemol. Tannin. Choline. Sterols: b-sitosterol and triterpenes, e.g. : s- amyrin.

Folk Medicinal Uses:

1- A decoction of the plant is used for rheumatic pains, asthma, bilharziasis, diabetes and to expel renal stones.
2- Flowering branches are used as stimulant, stomachic, slightly astringent, emollient, vulnerary, diuretic and for renal troubles.

Pharmacological Actions and Indications:

1- It relaxes plain muscles of the intestine, uterus and blood vessels; where it inhibits the force and frequency of plain muscle contraction.
2- It significantly increases the urine output/day and the level of sodium in urine.
3- It decreases body weight.
4- Chronic administration damages the liver.
5- It has a good healing effect on wounds.
6- It has antimicrobial activity against: *Streptococcus pyogens, Pseudomonas aeroginosa, Sarcina lutea, Bacillus subtilis, Klebsiella sp.; Aspergillus niger, A. flavus* and *A. tersus.*
7- It has an excellent molluscicidal activity due to its content of volatile oil and sesquiterpenes.
8- Sesquiterpenes: damsin, ambrosin, chloroambrosin and neoambrosin are cytotoxic against chinese hamester V-79 cells.
9- Oral administration of alcoholic extracts of *A.maritima* showed negligible effect on *Schistosoma mansoni* infection in mice.



Fig. 7- ***Ambrosia maritima*** L.
(After: Täckholm, 1974. Students' Flora of Egypt)

References:

1- Abadome, F.; Geerts, S. and Kumar, V. 1994. Evaluation of the activity of *Ambrosia maritima* L. against *Schistosoma mansoni* infection in mice. J. Ethnopharmacol. **44**(3): 195-8.

2- Abdallah, O.M.; Ali, A.A. and Itokawa, H. 991. Cytotoxic activity of sesuiterpene lactones isolated from *Ambrosia maritma*. Pharmazie, **46**(6): 472.

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4- Belot, J.; Geerts, S.; Polderman, A.M.; Symoens, J.J. and Triest, L. 1992. Comparative evaluation of the molluscicidal activity of *Ambrosia maritima* in Egypt and Senegal. In: Vector control of Schistomiasis using native African plants seminar, March 24, Brussels, pp. 101-112. Academie Royale des Sciences dí Outre-Mer, Brussels.

5- Triest, L.; Van de Vijver, M. and El-Arifi, M., Symoens, J.J. and Greets, S. 1992. *Ambrosia maritima*: morphology, distribution, genetic and chemical diversity. In: Vector control of Schistosomiasis using native African plants. Seminar, 24 March, 63-77, Academie Royale des Sciences dí Outre-Mer; Brussels.

6. **Anastatica hierochuntica L.**; Sp. Pl.; ed. 1, 641 (1753)

Arabic	:	*Kaff el adhra*	كف العذراء
		Kaff maryam	كف مريم
		Shagarat maryam	شجرة مريم
		Kufayfah	كفيفة
		Kaff Lala Fatima	كف لالافاطمة
		Shajarat el Talq	شجرة الطلق
		El- Kamsha	الكمشة

Berber : Akraba, Tamkelt.
English : St. Mary's flower, Rose of Jericho, Jericho resurrection plant.
French : Rose de Jéricho, Jerose.
German : Jerichorose, Marienrose.
Italian : Anastatico, Rosa de Gerico.
Turkish : Mariam eli, Mariam ÁiÁ.

Morphological Description:
A winter annual small stellate-canescent plant. It is branched radially from base, prostrate or decumbent and often *ca* 15 cm across. In rainy years and relatively moist habitats the plant attains considerable dimetere. While in dry years, the plants are very small. Leaves, oblanceolate to obovate, entire or obsoletely dentate above, to *ca* 3 cm long, 2 cm wide, tapering at base to a petiole, often about 2/3 as long as the blade. In flower, the plant is mostly a few cm high with minute, white, sessile flowers and oblong dentate leaves. Fruiting plants are larger, indurated, globose with incurved pungent branches carrying the persistent fruits. The plants roll inward after maturity to form a tight woody ball 4-10 cm in diameter. The fruiting plants are hygroscopic expanding their branches easily on immersing in water. The dead plants do not appear to be subject to decomposition by fungi or bacteria (Fig. 7, Plates 20 &21).

Ecology:
The plant grows in silty basins or wadi beds with shallow soil. The size of the plant is highly variable from habitat to another and from year to year. This

depends on the amount of available water supply. The plant, inconspicuous and short-lived when green and flowering, is more commonly noticed in the dry season after it has taken its characteristic woody, globose form (Plates 20 & 21).

Distribution:

Local : The plant is common in the Desert, the Red Sea and Sinai regions.
Regional : All North African countries.
Global : The Arabian Peninsula, N. Africa, Mauritania, Iran, and Pakistan.

Status:

The plant is widespread in various habitats in the desert. It is not endangered. However, in dry years, which are frequent, the seeds do not germinate, so there is no more replenishment of the seed bank in its habitat. But it is to be noted that the seeds remain intact on the mother plant till rain comes. The dried plant's clenched branches expand and straighten when soaked in water. This is a seed-releasing mechanism.

Part used:

Dry whole plant.

Constituents:

The whole plant contains flavonoids : luteolin-7-glucoside, isovitexin, kaempferol 7-glucoside, kaempferol 3 rhamnoglucoside, quercetin and rutin; and glucosinolates : glucoiberin and glucocheirolin. Sterols are also reported. Fruits contain glucose, galactose, fructose, sucrose, raffinose and stachyose.

Folk Medicinal Uses:

The dried plant crushed with sugar and taken as energetic purge for cases of jaundice, followed by milk as diet. Its resemblence to a clutched hand has led to being linked to the Arabic folklore to the hand of the Virgin Mary at chilbed. It is believed that Mary clenched this plant in her hand when giving birth to Jesus. It is thus associated with childbirth and is still used as a herbal remedy popularly believed to ease childbirth if consumed as a tea or used as a charm. Generally, the plant is used during childbirth; where the dried plant is soaked in water and the solution drunk by women at childbirth.

Pharmacological Actions and Indications:
The plant has been reported as an abortifacient and it has contraceptive properties.

References:

1- Khalifa, T. M..A. 1980. A pharmacognostical study of certain species of *Anastatica*, Ph.D. Thesis, Fac. Pharm., Cairo Univesity.
2- Rizk, A.M. 1986. The Phytochemistry of the Flora of Qatar. Scientific and Researh Centre. University of Qatar.



Fig. 8- Dry fruiting herb **of *Anastatica hierochuntica* L.**
(After: Boulos, 1983, Medicinal Plants of North Africa)

7. **Anchusa hispida Forssk.** Fl.Aegypt.-Arab. 40 (1775)

Gastrocotyle hispida (Forssk.) Bunge, Delect.Sem. Hort. Dorpat. 1849:2 (1849)

Arabic : *Kahil* كحل

Morphological Description:
Annual of variable habit and size, appressed-pubescent to hispidulous. Leaves linear-oblong to spathulate, obtuse or acute above, tapering at base, more or less repand-wavy, up to ca. 8 cm long, 1.4 cm wide. Flowers solitary in the leaf axils; calyx with triangular acute lobes 1.5- 3 mm long, spreading in fruit. Corolla about as long as or somewhat exceeding the calyx, pale blue or violet, rarely pink, with papillose scales in the throat. Nutlets ovoid, growing to exceed the calyx lobes slightly, ca 3 mm long, pale to nearly black, snail-shaped with a mouthlike, deeply concave, denticulate-margined basal ring (Plate 21).

Ecology:
The plant grows in shallow sandy soil with fine silt or limestone.

Distribution:
Local : The Mediterranean region, the desert, the Red Sea region and Sinai
Regional : North African countries

Status:
It is a fairly common plant in the desert.

Part used:
The leaves

Folk Medicinal Uses:
The plant can be used as a refreshing drink like tea.The decoction of the leaves is diuretic and is used in the treatment of rheumatism.

8. **Artemisia judaica L.**, Mant. Alt. 281 (1771).

Arabic	:	*Baathran*	بعثران
		Baethran	بعثران
		Shih	شيح
		Shih balady	شيح بلدى
		Shihan, Shihân	شيحان
		Hashîshah Khorasânîyh	حشيشة خرسانية

Berber : Techeredjili.
English : Judean wormwood, Wormwood.
Frenech : Absinthe de Judée, Armoise de Judée.
German : Wermut aus Judea.
Italian : Seme Santo.
Turkish : Yehuda pelin, Horasani.

Morphological Description:
It is a perennial herb, which attains up to 70 cm in height. The stem is erect, woody, profusely branched. It shows several slightly prominent ridges. It is light green in colour, rough, flexible, breaks with incomplete hard fibrous fracture. It is solid, yellowish-green internally, odour aromatic and a bitter persistant taste.

The leaves are alternate, sessile, simple, variously-lobed and ovate. Leaves are greyish-green in colour, with smooth velvet touch, brittle texture, an aromatic characteristic odour and a bitter taste.

The inflorescence carries hemispherical capitulae 1 cm in diameter, arranged in dense corymbose racemes. Each flower head carries 26-37 sessile tubular florets, which are inserted on a hollow receptacle. It flowers in late spring (Plate 22).

Ecology:
The plant grows in limestone wadis of the eastern Arabian Desert and Sinai.

Distribution:

Local : The plant grows in the desert regions, the Mediterranean region, the Red Sea region, Gebel Elba and Sinai.

Regional : Only Egypt.

Global : Arabia

Status:

The plant is overexploited for folk medicinal uses. It needs conservation, both *in situ*, and *εξ σιτυ*.

Part used :

The above-ground herb collected during the flowering stage.

Constituents :

Volatile oil up to 2.0% which contains piperitone, camphor, (-elemene, caryophyllene, bornyl acetate, borneol, isoborneol, p-cymene, α- and β-pinenes, camphene, myrcene, Δ^3-carene, limonene, g-terpinene, sabinyl acetate, thymol and nerolidol. It contains also the bitter principle judaicin.

Folk Medicinal Uses:

An infusion prepared from the flowering plant is used as stomachic, anthelmintic, expectorant, diaphoretic, analgesic, and antispasmodic in case of intestinal colic. Inhaled leaves relieve cold congestion, snakes are kept away by smoke of burnt branches.

Pharmacological Actions and Indications:

Volatile oil prepared from flowering branches has insecticidal, anthelmintic, anti-inflammatory and analgesic,antipyretic and stimulant effects. It has antimicrobial actvity against *Staphylococcus aureus, Candida albicans* and *Rodotorula rubra.*

Serum biochemical parameters in mice showed insignificant changes when treated with volatile oil of *A. judaica,* while a sharp increase was observed in neutrophil count and significant decrease in lymphocytes was noticed.

References :

1- Karawya, M.S.; Hifnawy, M.S. and El-Hawary, S.S. 1977. Volatile oil of *Artemisia judaica* L.; VII International Congress of Essential Oils, Oct.7-11, Kyoto, Japan.

2- Soliman, R.A. 1995. Some Pharmacological studies of certain medicinal plants. M.Sc. Thesis, Cairo University, Cairo.

Artemisia herba-alba Asso, Syn. Strip. Fl. Aragon. 117,t, f. 1 (1779).(= *Artemisia inculta* Del., Descr.t. Nat. 264 (1814), nom. nud.

The plant is an aromatic wooly-canescent undershrub, 30-60 cm high. Stems are many branching from the base. Root leaves and leaves of sterile branches petioled, bipinnatipartite into oblong to oblong-linear lobes, those of flowering branches much smaller, few-lobed and clustered. Heads sessile, ovoid, brownish, somewhat fleshy, orbicular, the inner ones oblong to oblong-linear acute, with a very broad scariuous margin (Plate 23).

The plant is a good range plant growing in the north-western coastal zone of Egypt and in the wadis of Sinai. Due to its content of volatile oil, the plant is commonly used in folk medicine.

Folk Medicinal Uses:

Leaves and flowers febrifuge, calmativer for stomach, cough and cephalagia; cures nervous troubles and calms the emotions; used for ophthalmic diseases; enters in mixtures for treating hemorrhagic wounds. Infusion of flowering branches vermifuge, emmenagogue, tonic stomachic. Dry powdered plants for healing wounds and burns, diuretic; infusion for rheumatism, bronchitis; cataplasm of boiled flowers used to ripen and cure abcesses, antidiarhhhoetic. Essential oil distilled from the plant antiseptic and insecticide, also used as parasiticide in veterinary medicine.

9. **Balanites aegyptiaca (L.)** Del.;Fl.Egypte 221,t. 28. f.1.(1813), Descr. Egypte, Hist.Nat.;III. 61,no.427 (1814)
Ximenia aegyptiaca L.;Sp.Pl.;ed.1, 1194 (1753)

Arabic	:	*Heglig*	هجليج
Fruits	:	*Balah Es-Sukkar*	بلح السكر
		Balahat Guha	بلحة جحا

Berber	:	Taboraq, Teisset, Addoua, Alo. **Fruits:** Ebora, Ibororhen, Tugga.
English	:	Thorn tree, Egyptian balsam, Zachum oil tree, Desert date, Soapberry bush.
French	:	Dattier du desert, Hagueleg, Balanite díEgypte
German	:	Aegyptischer Zahunbaum, Zachunbaum.
Italian	:	Dattero deserto.
Turkish	:	Haglig.

Morphological Description:

An evergreen small tree up to 8 m high, very variable, usually spiny, the branches spreading or pendulous; young stems and spines greyish-green becoming light brown, at first minutely puberulous or tomentellous, glabrescent later. Spines (0.6-)1.2-3(-3.2) cm apart, 0.1-0.4 cm above the axil (0.4-)2-8(-11.5) cm long, naked except for a few scale-leaves or rarely a single short lateral spine. Scale-leaves, rare, on young spines, falling quickly, triangular, acute, 0.75 mm long. Foliage-leaves, only on the stems, closely and minutely puberulous, often glabrescent, or sometimes densely tomentellous, subsessile or with a petiole (0.3-) 1.1-6.4(-6.8) x (0.3-)0.4-3.7(-5) cm, leathery; apex bluntly axcute to obtuse or rounded; base cuneate, sometimes narrowly decurrent; leaf apiculus (small extention between the two leaflets), 1.5-2.5 mm long, often falling. Flowers, 5-merous, (1-)2-15(-20 or more)variously arranged in loose or tight cymose fascicles at spinous nodes, on spineless stems, or closely arranged on shoots of short internodes, sometimes more or less spiciforme; pedicels finely tomentellous, 0.4-1.1 (-2) cm long. Sepals, sometimes falling early, tomentellous on the outside, 3.5-5 x 2 mm. Petals, narrowly obovate-elliptic, yellowish or blue green ,4.5-6 x 1-2 mm. Stamens, 10. Ovary pubescent to tomentose, tol mm high; style, 1-2 mm long. Fruit elongating markedly in early developmnt, becoming ovoid to ellipsoidal, usually rounded or truncate at both ends, usually ripening yellow, (2.3)2.9-4(-4.5) x (1.3-)1.7-2.2(-2.5) cm (Plate 24).

Balanites aegyptiaca is a multipurpose tree known by its many uses as fuel-wood, charcoal, timber, fodder, antifeed (pesticides), ..etc. In the Sudan, the fruits are edible and the seeds are crushed to produce oil for cooking. Both the fruit and the oil are used for medicinal purposes.

The fruit, which is edible,yields a valuable oil and also contains saponins which are lethal to certain invertebrates and thus of value in eliminating the carriers of guinea-worm and schistosomiasis. The trees are frequently heavily browsed.

Ecology:
The tree is drought and fire resistant and withstands up to 2 months flooding in areas near the river. In the Sudan, *Balanites* was formerly protected by law as well as by the local inhabitants who believe that *Balanites* trees bring the rains. This belief has given protection to the tree even in mechanized crop production schemes, where all other tree species were cleared for farming purposes. However, with the recent development in carpentary technology and the increased human pressures for its valuable timber, the tree is continuously cut. Though the tree regenerates naturally by seeds or by its moderate coppicing, yet with such rate of clearance of the species, is endangered.

Distribution:
Local : Gebel Elba, South Eastern Desert, Oases
Regional: Egypt, Libya, Algeria and Morocco
Global : Subtropical , Tropical Africa, and Arabia

Status:
The plant is used for different purposes, fuel, timber, medicinal, shade, etc. Propagation of the plant is necessary as the plant is endangered.

Part Used:
Stem Bark and the fruits.

Constituents:
The kernel (10%) contains 40 %- 58 % of liquid glyceride oil . The mesocarp contains 38 % sugars, 15% organic acids and 46 % other organic substances. In Uganda, the kernels of seed yield 48.8 % of golden yellow oil for soap-making.

Stem bark contains a saponin. The plant contains balanitin -1, -2 and -3; balanitin -1 for example possesses a yamogenin aglycone with a branched glucose and rhamnose side chain. The plant is reported to contain 5.6 % diosgenin. Seeds contain furocoumarins.

Uses :
As fish poison but not toxic to man. Anthelmentic, purgative, vermifuge, emetic and in the treatment of boils, leucoderma, herpes, malaria, wounds, syphilis, cold and liver. The oil of fruit kernel is used for dressing wounds and in rheumatism.

Cultivation:
The plant can be cultivated by seeds and cuttings.

References :

1- Hardman, R. and Sofowora, A. 1972. Economic Botany. **26**:169-73.
2- El Nour, M.; El Khalifa, K.; Massimo, K. and Hassen, B. 19... Preliminary study on seed pregermination treatment and vegetative propagation of *Balanites aegyptiaca* (L.) Del.; In: A.Riedacker et al (eds), Physiologie des Arbres et Arbustes en Zones Arides et Semi-arides. John Libbey Eurotext, Rome, Italy, pp.413-416. Groupe d'Etude de l'Arbre- Paris, France.
3- Oliver Bever. 1986. Medicinal Plants in Tropical Africa. Cambridge University Press.

12. **Bryonia cretica L.**;Sp.Pl.;ed.1,1013 (1753).

Arabic : *Le'eba Murrah* لعبة مرة

Status:

This species is now almost extinct in Egypt. A few specimens were collected from the Western Mediterranean Coastal zone of Egypt (between Alexandria and Mersa Matruh). This plant grows mainly in the sandy habitats near the coast. The severe and drastic changes in the habitat supporting this species lead to its extermination. It is to be noted that its habitat is the place where the new summer resort areas were established all over the coastal zone. The removal of this habitat is the main reason for its extinction.

One may claim that the collection of the plant is among the reasons of its extinction. However, this was practiced till the late sixties of this century. Till that time, it was possible to find a specimen here and there. After the seventies, and the boom of constructions and development of the summer resorts, the habitat supporting this species has been completely eradicated.

The following records are those in the Herbarium of the Department of Botany, Faculty of Science, Cairo University :

Alexandria,April,1903; Blandenier
Ikingi Mariut,16.4.1911; G.Maire
Mariut caves,1929; Drar
Mariut, Burg El Arab, 18.3.1931; Oliver
Burg El Arab, 18.3.1931; Oliver
Mariut, 13.3.1952; Kamel
Abuqir,14.3.1954; El-Hadidi
Between Alexandria and Mersa Matruh, 25-28.2.1958; Botany Dept. Excursion
Burg El Arab, 2.4.1960; S.Ghabbour
Burg El Arab, 2.4.1965; I.El-Sayed

Being almost an extinct plant in Egypt, it seems important to show the numerous citations of this species in the different botanical sources.

Bryonia cretica L.; Sp.Pl.; ed. 1, 1013 (1753)
ed. 2, 1439 (1763)
ed. 3, 1439 (1764)

Lam.;Encycl. I, 498 (1783)
Willd.; Sp.Pl.; ed. 4, 621 (1805)
Desf.; Choix de pl.; 91, t.70 (1808)
Delile, Fl.Aegyp. Illus. ii, 77, Art 931 (1812)
Ser. in DC Prod. III, 307 (1828)
Sibth.; Fl.graec. X, 31, t. 940 (1840)
Naud. in Ann. sc.nat.; 4 ser XII, 138 (1859)
Unger et Kotschy, Die Insel Cypern, 341 (1865)
Boiss.; Fl.Orient. II, 760 (1872), Supp.; 242 (1888).
Cogn. in DC. Mon.Phan. III, 472 (1881)
Ascherson et Schweinf. Illus. Fl. Egypte, 77 (1887)
Sickenberger Contrib.Fl.d'Egypte, 237 (1901)
Halacsy, Consp.Fl.Graec.; 1:550 (1901)
G.Dortler in Verh.zool.bot.Ges.; Wien LV, 19 (1905)
Durand & Barratte, Fl. Lib.Prodr. 158 (1910)
Muschler, Man.Fl.Egypt II, 941 (1912)
Cogn.u.Harms in Pflanzenreich IV, 275, pl.81 (1924)
Post, Fl.Pal.;ed.2, 1:481 (1932)
Pamp.; Prodr. Fl.Ciren. 428 (1931)
Tutin in Tutin et al.; Fl.Europ. 2:297 (1968) quoad ssp.*creticam tantum*
Davis,Fl. Turkey, 4:204 (1973)
Taeckholm, Studentís Fl. Egypt, ed.2.; 372 (1974)
Meikle,Fl.Cyprus 1:678 (1977)

Morphological Description:

Climbing perennial herb, with fleshy roots, stem annual, slender, grooved and ridged, branched, glabrous or sparsely pilose. Leaves, petiolate. Petiole, rather robust, glabrous or sparsely rough, 2-6 cm long. Lamina orbicular, palmately 5-lobed or 5-partite, at the base rather deeply emarginate, firm strongly asperous, pale or deeply green above, white striate at the nerves, yellow below, 5 to 12 cm long and nearly as broad. Tendrils, slender, elongated. Flowers, dioecious. Sepals 2 mm long. Petals, livid-yellow with subarticulate green nerves, puberulous on the outside, with ovate-oblong, obtuse segments, which are 5 to 6 mm long. Male flowers on a slender peduncle, 8-18-flowered, 5-10 cm long, pedicel filiform , spreading, 0.5 to 2 cm long. Filaments of the stamens long-villous, 1 to 1.5 mm long , anthers, 3 mm long. Female flowers few, corymbose or subsolitary, common peduncle from 0.5 to 2 cm long, pedicels rather long. Style not exerted with rough stigmata. Fruit, a globular green berry before maturity,with white veins, then becomes red, indehiscent, 8-9 mm in diameter. The fruit, contains 3-6 seeds. Seeds, favulous, and dark-red veined, very slenderly rugulous, smooth at margin, 4-6 mm long, 2-4 mm wide, 1-2.5 mm thick (Plate 25).

Ecology:
The plant grows in deep sandy soils in the Mediterranean coastal zone. It grows mainly in relatively moist habitats, i.e. in caves and depressions receiving runoff water. In Cyprus, it has been recorded to grow in forests, scrub, hedges, sea level to 1000 ft alt.

Distribution:

Local	:	There are records from Abuqir,Burg Al Arab, Ras El Hikma, and Matruh.
Regional	:	Egypt and Libya only.
Global	:	East Mėditerranean region, from Greece and Cyrenaica to Palestine, Egypt, Cyprus, and Crete.

In the other countries of North Africa (Libya, Tunisia, Algeria and Morocco) another species of *Bryonia* has been recorded, i.e. ***Bryonia dioica*** Jacq.

Part Used:
The roots collected in summer, kept entire or split longitudenally and dried. They are known as *Le'eba Murrah*

The roots as they occur in commerce are generally small in size, conical in shape, varying from 5 to 15 cm in length and 1 to 3 cm in diameter. They are crowned with the stem scars; longitudinally wrinkled at intervals with very faint transverse ridges. They are hard, smooth and pale yellowish-pink externally; white, starchy and do not show any concentric rings internally. The fracture is short and mealy; taste, bitter and acrid; odour, very faint. During the process of drying the roots shrink enormously and the outer greyish-yellow corky layer is almost entirely removed.

The roots are bitter, tonic, alterative, purgative and are used as a remedy for diabetes by the natives.

Constituents:
The drug contains about 40 % of starch; 2.5 % of resin; about 0.25 % of an amorphous glucosidal principle; 0.2 % of an amorphous alkaloid; an alcohol, bryonol; traces of phytosterol; volatile oil; enzymes; ....etc. Ash about 6%.

Folk Medicinal Uses:
The drug is mainly used in Egypt as a bitter tonic and to ameliorate the condition of diabetic persons. It is also used as a hydragogue cathartic and diuretic in pleurisy, dropsy, whooping cough, bronchitis and tonsilitis. Applied to the skin, it is irritant and may cause vesication.

It is to be noted that the roots of bryony referred to in the ancient and modern literatre are those of *Bryonia dioica* and *B. alba*. *B. dioica* is among the North African plants, therefore it seems reasonable to give an account of this species, especially that its collection would threaten its existance.

Bryonia dioica Jacq.

Arabic	:	*Enab el hayah*	عنب الحية
		Butaniyah	بوطانية
		Khiytah	خييطة

Berber : Tailoula, Tara bouchehen, Telmoumi.
English : Snake - bryony, white wild vine, common bryony.
French : Navet du diable, Bryone dioique, Bryone-couleurvrée, Vigne noire.
German : Rote Zaunr.
Italian : Rape del diavolo, R. di serpente, Barbone
Turkish : Ak asma, seytan salgami

Part used:
Dried sliced root of *B. dioica* Fam. *Cucurbitaceae.*

Description:
The dried slices about 5 cm in diamter and have a thin yellowish-grey cork, a whitish wood marked with concentric rings and radially arranged vessels.

Constituents:
Starch, bryoresin, glycosides, essential oil, bryocinin, bryonin, invert sugar, unknown purgative components, alkaloid, fatty acids and bryonol.

Folk Medicinal Uses:
Cathartic, diuretic, irritant to the skin. It is recommended for pleurisy, whooping cough and bronchitis and has been given in cases of dropsy. It is also used in rheumatism, depurative of blood, antitumor and for epileptic crises.

Pharmacological Actions, Indications and Toxicity:
The juice from the fresh root first causes reddening then painful inflammation with the formation of blisters. The acrid-tasting, shiny berries of *Bryonia* species

are likewise toxic. Repeated vomiting is the evidental symptoms of poisoning in addition to abdominal pains, bloody diarrhoea, dizziness, renal inflammation and in serious cases respiratory paralysis.

References :

1- El-Keiy, M.A. and F.M. Hashim. 1956. The microscopic structure of Egyptian bryony root. Egypt. Pharm. Rep. **38.**

2- Fahmy, I.R. 1932. Medicinal Plants and Vegetable Drugs, Paul Barbey's Print.Office, Cairo.

3- Fahmy, I.R. and M.A. El Keiy. 1931. *Byronea cretica* L. Rep. Pharm. Soc. Egypt III.

4- Frohne, D. and Pfänder, H.J. 1983. A Colour Atlas of Poisonous Plants, Wolfe Science.

5- Halim, A.F.; E.S. Mansour and H. Abdel-Fattah. 1989. Cucurbitacins and asteryl glucoside of *Bryonia cretica* L. grown in Egypt. Mansoura J. Pharm. Sci. **6 (1)**: 22.

6- Hassib, M. 1938. Cucurbitaceae in Egypt. The Fouad I University, Faculty of Science,Publ. No.3, pp173.

11. **Calotropis procera (Aiton) W.T. Ait.f.**;Hort.Kew.ed.2,2:78 1811.

Asclepias procera Ait.; Hort. Kew. 1:305,1789.

Arabic : Oshar عشار – عشر

English : French cotton, Mudar plant
French : Calotrope, Arbre a soie, Fafetone, Pomme de Sodome
German : Wahre Mudarpflanzer, Gomeiner
Italian : Calotropo
Turkish : Ipek ag
Berber : Torcha, Tourza, Ngėyi

Description:
Erect shrub or tree, 3-5 m high, much branched from the base, latex milky, young branches covered with white cottony tomentum. Leaves up to 27 x16 cm, broadly ovate, ovate-oblong elliptic or obovate. Entire, base cordate, apex acute, subsessile. Flowers ca 2.5 cm across, white outside, purplish within, darker on the tips. Fruit 10-14 cmx 9-11 cm, subglobose. Seeds *ca* 8 mm long, 6 mm broad, ovate (Plate 26).

Ecology:
The plant grows in fine sandy soils. It is widespread in the deserts of the Middle East in localities already occupied by the settlements of Bedouin. Usually, it grows as a secondary vegetation after the eradication of *Acacia* trees for fuel-making.

Distribution:
Local : It grows in almost all the phytogeographical regions of Egypt, except the Mediterranean region.
Regional : Egypt, Libya
Global : Tropical to dry parts of Africa, Arabia, Palestine, W. Indies, Brazil, Colombia and Venezuela.

Status:
The plant is widespread. No fear of extinction.

Constituents:
Cardenolides: calotropin, calotoxin, saponin, and choline.

Folk Medicinal Uses:

A decoction is used in vetrinary medicine, antileprosy, Powdered dried leaves are vermifuge in small doses. Thery are smoked for asthma. Fresh leaves are used in the form of cataplasm for sun stroke. Leaf extracts cardiotonic. Roots are emetic, expectorant. Root bark is used for dysentry. Latex causes serious inflammations and may lead to blindness. It is uased for scabies of the camels and goats. It is applied on the teeth to loosen them. It is used as a drastic purgative, emmenagogue, for bites and skin diseases. Flowers are used in small doses for cold, cough, asthma, and in digestion. It was used by ancient Indians as arrow poison due to its slow effect on the heart similar to *Digitalis.*

Fruit fibres and seed hairs may be used for filling cushions and for making ropes. Wood is used for making powedered pyrites and gun powder chacoal.

Pharmacology:

Alcoholic extract stimulates rabbit s intestine, rectus abdominus muscle of frog and contracts the uterus of virgin female rats.

References :

1- Mahran, G.H.; M.M. Rizkallah and A.H. Saber. 1971. A phytochemical study of *Calotropis procera* (Ait.) R.Br. growing in Egypt. Bull. Fac. Pharm., Cairo Univ. **10**: 1.

2- Mahran, G.H. Y.W. Mirham; A.A. Seida and I.A. Shehata. 1983. A study of the lipid and cardenolide contents of the seed of *Calotropis procera* (Ait.). Bull. Fac. Pharm., Cairo Univ. **22 (1)**: 159.

3- Mahran, G.H.; Y.W. Mirham, A.A. Seida and J.A. Shehata. 1984. Cardenolides of the latex of *Calotropis procera* (Ait.) R. Br. Bull. Fac. Pharm., Cairo University **23 (1)**.

12. Capparis spinosa L.

Arabic	:	*Akbaar*	أكبار
		Asef	أصف
		Shafallah	شفلح
		Kabar	كبار
		Lasaf	لصف

Berber : Terloulout, Taybult, Amserlih, Tsailih, Tsailaoul, Ouai lonlou, Belachem.
English : Common Caper-bush.
French : C,prier, C,prier commun, Caprier epineux.
German : Echter Kappernsrauch, Kapper.
Italian : Cappero, Cappers deí muri, Cappirs spinosa.
Turkish : Keber fidani, Kebere.

Morphological description :
It is a low perennial trailing shrub, with procumbent or pendulous branches. Leaves are greyish-green, sound, simple and thick. Flowers are white with red stamens. They appear from March to June. Each flower lasts for one day. Fruits with numerous light brown seeds (Plate 27 & 28).

Ecology:
The plant grows in compact fine-textured soil as well as on steep cliffs.

Distribution:
Local : Deserts, Oases, and Sinai.
Regional : All North African countries.
Global : Widespread, especially in Mediterranean countries and the Arabian Peninsula

Status :
The habitat of this species, including all its varieties, is subjected to severe disturbance. There is a great need to conserve the various subspecies.

Part used :
The whole plant .

Constituents :
Alkaloids which amount to 0.91% in the root bark, 0.86% in the seeds, 0.02% in the leaves and 0.04% in the fruits. Stachydrine was isolated and identified in the plant. Flavonoids: Quercetin-3-rutinoside, quercetin-7-glucorhamnoside, kaempferol-3-rutinoside, kaempferol-3-rhamnorutinoside and rutin (2.1%). Glucocapparin volatile oil; sterols and saponins.

Folk Medicinal Uses :
Roots are used as tonic, astringent and duiretic. Root bark, appetizer, purgative, anthelmintic, emmenagogue, analgesic and applied externally as cataplasm for spleen troubles. Bark is used for treatment of gout, rheumatism, laxative, expectorant and for chest diseases. Infusion prepared from the stem and root bark for diarrhoea and febrifuge. Flower buds and roots are utilized as renal disinfectants, duiretic, tonic and for arteriosclerosis and chills, as well as compresses for the eyes. Leaves and fruits are carminative and aphrodisiac. Fresh fruits are antiscorbutic, their infusion is used for sciatica. Powdered fruits mixed with honey are taken in the morning for sciatica and backache (Rabat drug market). Flower buds are refreshing, stimulant and slightly diuretic. Seeds for treatment of feminine sterility and dysmenorrhea. They are crushed and applied externally on ulcers, ganglions and scrofula. The flower buds are pickled. Young buds are used for pizza flavouring.

Pharmacological Actions, Indications and Toxicity:
1- The herb has a hepatoprotective effect. It reduced significantly serum transaminases.
2- It has an antitumor activity against human leukemia *in vitro*.
3- It has an immunosuppressive effect.

References :
1- Chaya, G.; Mishra, S.H. and Gadgoli, C. 1995. Preliminary Screening of *Achillea millifolium*, *Cichorium intybus* and *Capparis spinosa* for Antihepatotoxic Activity. Fitoterapia, 66(4): 319-323.
2- El-Tanbouly, N.D. 1990. A Pharmacognostical study of *Capparis spinosa* L. var. *aegyptia* Boiss. growing in Egypt. Ph.D.Thesis, Faculty of Pharmacy, Cairo University.
3- Shirwaikar, A.; Sreenivasan, K.K.; Krishnanand, B.R.; Kumar, A.V. and Vasanth, K.A.1996. Chemical Investigation and Antihepatotoxic Activity of the Root Bark of *Capparis spinosa*. Fitotherapia **67**(3): 200-204.

13. **Centaurea pumilio L.**;Cent.Pl.;1:30 (1755)

Aegialophila pumila (L.) Boiss., Diag. Pl.Orient.; ser.1,10:105 (1849).
Centaurea mucronata Forssk., Fl. Aeg. pt. 151 (177S)

Arabic : *Akash* عكش

Description:
Stemless, somewhat fleshy perennial herb, frequently with a large root tuber. Close to *Centaurea*, bur achenes silky with a small scarious persistent crown and a deciduous pappus. Flower heads large, with white or pink radiating flowers. Iunvolucral spine 5-6 mm long (Plates 28 & 29).

Ecology:
The plant grows on the maritime pseudo-oolitic sand dunes in the western Mediterranean coastal zone. It is to be noted that *Cistanche* sp. parasatises on this plant. *Centaurea pumilio* sends deep fleshy roots in the sand dunes to a depth more that 50 cm, the fine roots extend more than one metre, deep and 2 m horizontally.

Distribution:
Local : The western Mediterranean coastal zone

Status:
The plant is seriously endangered for two reasons: firstly due to the overcollection of the plant by uprooting it to make use of the roots in folk medicine; secodly due to the eradication of the habitat of the plant due to the construction of buidlings and villages as summer resort in the western coastal zone.

Part used:
The dried roots which are cut into slices (Plate 29).

Folk Medicinal Uses:
It is used as a fattening agent added to other ingredients.

References :
Sawsan El Masry; A.A. Omar; M.I. Abo Shoer and M.R. I. Saleh. 1980. Flavonoid constituents of *Aegialophila pumila* Boiss. Journal of Drug Rescarch 12 (1-2).

14. **Centaurium pulchellum (Swartz) Druce**, Fl. Berkshire 342 (1898)

Gentiana pulchella Swartz, *Gentiana ramosissima* (Vill.) Pers.;
Erythraea pulchella (Sw) Fr.; *Centaurium ramosissimum* (Vill.) Druce

Arabic : *Qantariuon* قنطريون

English : Branching Centaury
French : Centauree
German : Flockenblume
Italian : Fiel di terra
Turkish : Bueyuet kantarion

Morphological description :
Annual glabrous herb. Stem, erect, stiff, much branched. Leaves, rosette, sessile, ovate, basal leaves obtuse. The upper leaves, ovate, lanceolate, acute and smaller. Flowers, pink, forked, cymose-paniculate short-pedicelled, corolla tube, 1 -2Ω times longer than calyx segments. Its lobes oblong, obtuse. Stigma, oval, anthers oblong. Fruit, capsule, two-valved, many seeded. Seeds, minute, bright brown. Flowers from March to May.

Ecology:
Habitat conditions : moist soils.

Distribution :
Local : Fairly common plant , grows mainly among cultivated crops by water sides in Fayoom area and the North coast .

Status:
The plant grows in specific moist habitats, which are subjected to changes and drying. So, the plant is endangered in Egypt.

Part used :
The whole flowering and fruiting herb.

Constituents :
It contains the alkaloid gentianine; a bitter principle kantaurin, a triterpene; oleanolic acid, erythrosterol, and xanthones; 1-hydroxy-3,7,8-tri-methoxyxanthone, 8-dihydroxy-3,7-dimethoxyxanthone and 1,8-dihydroxy-3,5-dimethoxyxanthone.

Folk Medicinal Uses :

A decoction is used for gastric and abdominal pain, hypertention, renal colic, rheumatic pains and for the elimination of stones from the kidney and urethera; healing agent for wounds in ointments for sciatica. An infusion of the herb is used for diabetes.

Substitutes :

The flowering and fruiting herb of *C. spicatum*. It is characterised by leaves, oblong or oblong-lanceolate, obtuse at the apex. Flowers, spicate, racemose on simple leafless branches. Corolla tube, longer than subulate calyx segments.

References:

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2- El-Shanawany, M.A.; M.A. Makboul and A.M. Abdel Baky. 1989. Phytochemical study of *Centaureem pulchellum* (SW) Druce. grown in Egypt. Bull. Pharm. Sci., Assiut Univ. **12 (3)**: 416-421.

3- Rizk, A.M. and El-Ghazaly, G.A. 1995. Medicinal and Poisonous Plants of Qatar, University of Qatar, Doha.

15. **Centaurium spicatum (L.) Fritsch,** Mitt.Naturwiss. Vereins.Univ.Wien,ser 2,5:97 (1907)

Gentiana spicata L.; *Erythraea spicata* (L.) Pers.

Arabic : *Qantarioun* قنطريون

Menash ed-dibban منش الدبان

Nashash ed-dibban نشاش الدبان

English : Spicked Centaury
French : Petite Centaurée

Morphological Description :
Stems, glabrous, erect, strict, usually branched. Leaves, oblong, or lanceolate oblong, sessile, clasping at the base. Flowers, pink, sessile, distant and spicate-racemose on the mostly simple and leafless branches, tube of the corolla somewhat longer than the subulate calyx segments, 2-3 times as longer as the linear oblong lobes. Fruit, capsule with numerous minute, brown seeds (Plate 30).

Ecology:
In moist habitats.

Distribution:
Local : Oases, Nile Valley, Mediterranean region and Sinai
Regional : All North African countries
Global : Widespread in old and new world.

Part used :
The obove-ground herb of *Centaurium spicatum* (L.) Fritsch.

Constituents :
Bitter substances, triterpenes and resin .

Folk Medicinal Uses :
The herb is used for hypertension, elemination of ureter and kidney stones, healing agent for wounds, as ointement for sciatica and as infusion for diabetes.

Pharmacological Actions and Indications:

LD_{50} = 3875 mg per Kg. Toxicity Symptoms: arched back, abdominal pain, quick and shallow respiration. Ethanolic (70%) extract has inhibitory effects on rabbits duodenum, rats uterus, isolated rabbitís heart, hypotensive in large doses to dogs, diuretic, with androgen-like effect on rats, hypoglycemic, with no hepato-protective effect.

The plant extract exhibited antibacterial activity in vitro against *Staphylococcus aureus, Streptococcus pyogenes, Corynebacterium pyogenes, Salmonella typhimurium, Escherichria coli* and *Pseudomonas aeruginosa.*

Prolonged adminstration produces significant decrease in body weight, decrease in RBCs count, increased PVC, MVC, MCH and WBCs count. It causes destructive changes in liver and kidney.

References:

1- Al-Zorba, H.Y.M. 1997. Pharmacotoxic studies on *Cleome droserifolia* and *Centaurium spicatum* herbs used in folkmedicine. M.V.Sc.Thesis, Cairo University.

2- Britton, N.L. and Brown, A.1970. An Illustrated Flora of The Northern United States and Canada.Vol.3.Dover Publication, Inc., New York .

3- Khafagy, S.M. and H.K. Mnajed. 1967. The chemical study of the glycosidal substance isolated from *Centareeum spicatum* L . grown in Egypt . U.A. R. J. Pharm. Sci. **8 (1)**: 187.

16. **Cleome droserifolia (Forssk.) Delile,** Descr. Egypte, Hist. Nat. 250 (1814)

Roridula droserifolia Forssk.; Fl. Aegypt- Arab. LXII. (1775)

Arabic	:	*El-Samwa*	السموة
		Afein	عفين
		Reh elBard	ريح البرد
		El-Mashtar	المشطر

Morphological Description:

A wild perennial herb about 60 cm high, much branched. The plant carries cauline leaves. They are simple exstipulate and petiolate. The petiole is green, long and cylindical. It measures from 1.1 to 1.3 cm in length and from 0.2 to 0.3 cm in diameter. The lamina is ovate-rotundate having an entire margin, an obtuse apex, and asymmetric base. It measures from 0.8 to 0.9 m in length and from 0.5 to 0.8 cm in width. The venation is triple-nerved at the base, the veins being more prominent on the lower surface. The upper surface is green in colour and the lower surface is lighter in colour. The leaves have a characteristic slightly disagreable odour and a bitter taste. Flowers are yellow. The flowering stage is form February to August (Fig.9 & Plate 30).

Ecology:

The plant grows in rocky and gravelly habitats.

Distribution:

Local : The deserts, especially the Eastern desert, Red Sea region, Sinai, Gebel Elba.
Regional : Egypt and Libya
Global : Arabia, Ethiopia, Egypt and Libya

Status:

In the last decade the plant has been subjected to severe overexploitation to be used in folk medicine for diabetes. It has been eradicated from vast areas, especially in Sinai and the Eastern desert. However, in the far south of the Eastern desert, the plant is still flourishing and is growing in many wadis. Conservation of this species is urgent.

Part used:
The air-dried herb, known as:

Arabic	:	*Al-Samwah* السموة
English	:	Cleome herb,
Latin	:	**Herba Cleome droserifolia**

Constituents:
Volatile oil about 0.4% which consists of 3-butenylisothiocyanate, 2-methylbutenylisothiocyanate, benzylisothiocyanate,α, β and γ-caryophyllene, 2-naphthyl-n-propyl ether. Sesquiterpenes: carotol and dihydrodihydroxy carotol.

Gluosinolates with sulfur aglycones e.g. glucocapparin. Flavonoids (0.295%) which consist of kaempferol-3,7-dirhamnoside, isorharmnetin-3-gluco-7-rhamnoside, kaempferol-3-gluco-7-rhamnoside, quercetin-3-gluco-7-rhamnoside, kaempferol, artemitin, 5,7,4-trihydroxy-3-methoxy flavone, 5,7,4-trihydroxy-3,3-dimethoxy flavone, 5,7,4-trihydroxy-6,3\-dimethoxy flavone (jaceosidin), 5,4-dihydroxy-3,6,7 trimethoxy-flavone (penduletin), 5, 7, 3, 4-tetrahydroxy-3,6-dimethoxy flavone (axillarin), 5, 3-dihydroxy-3, 6, 4, 5-pentamethoxy flavone, 5, 4-dihydroxy-3, 6, 7, 8, 3-pentamethoxy-flavone,5-hydroxy- 3, 6, 7, 3, 4, 5-hexamethoxy flavone. Sterols e.g. β sitosterol and stigmasterol, triterpenes, saponins, coumarins, alkaloids and docosanioc acid.

Folk Medicinal Uses:
1- Paste of powder used topically for treatment of wounds and for dermatitis.
2- Powder (5 g.) taken before meal, for treatment of hyperglycemia (diabetes).

Pharmacological Actions and Indications:
1- Aqueous and chloroformic extracts of the herb showed a significant reduction of blood glucose in rats.
2- Aqueous extracts of the herb showed a good antimicrobial activity against *Staphylococcus aureus, Streptococcus faecalis, Pseudomonas aeruginosa, Proteus vulgaris, Klebsiella pneumoniae, Escherichia coli* and *Candida albicans.*
3- LD_{50} = 2175 mg per Kg. Toxicity symptoms: tremors, convulsions, arched back, sweating, rapid and shallow respiration, coma followed by death.
4- Ethanolic (70%) extract of the plant has antihistaminic effect, inhibitory effect on rabbits duodenum, uterus, rabbits heart, a relaxant effect on guinea pigís trachea, decrease in arterial blood pressure, diuretic and mild tranquilizing effect with moderate progesterone-like action.
5- Hypoglyceamic and hepatoprotective. It is safe for oral administration.
6- It causes decrease in body weight in rats.



Fig. 9- ***Cloeme drosearifolia*** **(Forssk.) Del.** A. fruiting branch
B. flower C. seed.
(After: Jafri, 1977, Flora of Libya, No. 12, Capparaceae).

Toxicity:
Very toxic if given intrapretoneally.

References:

1- Ayoub, N.A. 1993. Phytochemical study of certain Egyptian plants used as antimicrobial folk remedies. M.Sc. Pharm. Thesis, Faculty of Pharmacy, Cairo University.

2- El-Zorba, H.Y.M. 1997. Pharmacotoxic studies on *Cleome droserifolia* and *Centaurium spicatum* herbs used in folkmedicine. M.V.Sc.Thesis, Cairo University.

3- Ismael, L.D. 1992. Pharmacognostical Study of *Cleome* Species Growing in Egypt. M. Pharm.Sci., Thesis, Faculty of Pharmacy, Al-Azhar University.

4- Netzar, Y.; Palevitch, D.; Perl, M.; Schilcher, H.; Phillipson, J.D. and Loew, D. 1993. The effect of some plant extracts on body weight and on some biochemical activities on rats. Acta Hort. 332:207-217.

5- Seif El-Din, A.A.; F.A. Darwish and A. Abou Donia. 1987. Flavonoids from *Cleome droserifolia* (Forssk.) Del. growing in Egypt. Egypt. J. Pharm. Sci. **28 (1-4)**: 313

17. **Colchicum ritchii R. Br.** Denham & Clapperton, Trav. Afr.Appl.241 (1826)

C. aegyptiacum Boiss..

Arabic	:	*Oknah*	عكنة
		Farg el ard	فرج الأرض
		Khamirah	خميرة
		Khamieret Al Arab	خميرة العرب

Morphological description :
Small perennial herb. Corm, oblong, 20-30 cm long, with 6 brown leathery tunics prolonged above the bulb, leaves, lanceolate - linear, spreading -reflexed, the margin often smooth. Flowers, 2-8, pink, rarely white in colour, tubular, long and borne close to ground on the corm, a solid fleshy stem. After flowering a short underground stem develops between the corm and the ripening fruits, these finally appear as a terminal cluster of capsules supported by a crown of rosetted leaves. Seeds, spherical and developed with the flowers, which are up to 10-20 cm long 5-15 mm broad (Plates 31 & 32).

Ecology:
The plant has been considered to be extinct since a long time. No material was collected since a long time. However, in the present project, the field surveys showed that the plant grows in vast areas in the Mediterranean coastal zone to the south of the sea about 20 km. It grows on hard compact, stony soils. The common associate is *Haloxylon articulatum*. The community in which the plant grows is subjected to overgrazing. Leaves of *C. ritchii* are grazed, and the plant is dug by the Bedouin to be sold to traders selling it to the Alexandria and Cairo *attarin* shops.

Distribution:
Local : The Western Mediteranean coastal region, Daba'a and Hammam.
Regional : No records
Global : No records

Status :
The plant in addition to being of limited distribution in the western coastal zone, it is dug be the Bedouin. The Bedouin use a special digger called *Jizz* to uproot the plant.

Part used :
Seeds and corms.

Constituents :
Alkaloid, colchicine, colchicoside, fat, tannin, oil, and gallic acid.

Folk Medicinal Uses :
In arthritis, rheumatism, gout, abdominal colics and as emetic.

Pharmacological Actions and Indication:
The exact mechanism of action of colchicine in the treatment of gout is not known. It inhibits leucocyte migration and reduces lactic acid production by leucocytes which results in a decrease of deposition of uric acid. In addition, there is a reduction in phagocytosis which decreases the inflammatory response. Colchicine is used as a suppressant for gout.

References:
Robbers, J.E.; Speedie, M.K. and Tyler, V.E. 1996. Pharmacognosy and Pharmacobiotectnology. Williams & Wilkins.

18. **Commiphora opobalsamum (L.) Engl.** In DC.; Monogr.Phan. 4:15 (1883)

Amyris opobalsamum L.; Amoen. Acad. 7:68 (1762)

Arabic	:	*Balasam*	بلسم
		Balsam Makka	بلسم مكه
		Basham	بشام
		Balsam Israel	بلسم اسرائيل

English : Balm of Gilead, Carpobalsam, Balsam Judatum, Balsam of Mecca.
French : Baumier, Balsamier de Gilead, Balsamier de laecque, Balsam de Judée, Balsamier de la Mecque
German : Mekka Balsambaum, Opobalsambaum
Italian : Albero balsamico, Balsam di Gillead, Balsamo della Mecca
Turkish : Belsem ag, Mekke pelsengíi ag, Balsam ag

Morphological Description:
Shrub or tree to 4 m, often with long slender drooping branches:bark grey. Leaves 3-foliate or pinnate with 5 leaflets, glabrius to pubescent; petiole 4-20 mm, leaflets narrow-elliptic to obovate, entire. Flowers in 1-3-flowered cymes.

Ecology:
The plant grows on the slopes of mountains in Gebel Elba region.

Distribution:
Local : Gebel Elba
Regional : East Sudan, Somalia, Arabia .

Status:
The plant is rare in Egypt and is endangered.

Part Used:
The hardened gum resin which exudes through natural fissures or incisions made in the bark. Myrrh is usually collected from *Commiphora myrrha* (Nees) Engl. (=*C. molmol* (Engl) Engl.). Myrrh is also collected from other species of *Commiphora*, among which is *C. opobalsamum*. The myrrh occurs in brownish-yellow or brown tears or irregular masses of a dusty appearance, generally mixed

with sand and vegetable debris. It has no aromatic odour and a bitter taste.

Constituents:

It contains about 2.5 to 8 % of a volatile oil which rapidly resinifies on exposure to air. 25-40 % of a resin consisting of commiphoric and other acids, either free or combined with two phenolic resins; and 40 to 60 % of a gum allied to gum arabic. It also contains an oxidising enzyme and a bitter principle, which does not dissolve in water. Ash would not exceed 5 %.

Folk Medicinal Uses:

Antiseptic, expectorant, added to gargles and mouth washes. Myrrh is supposed to have been used by the Ancient Egyptians in the embalming process. It has been mentioned in the Old Testament. Myrrh is used in perfumery.

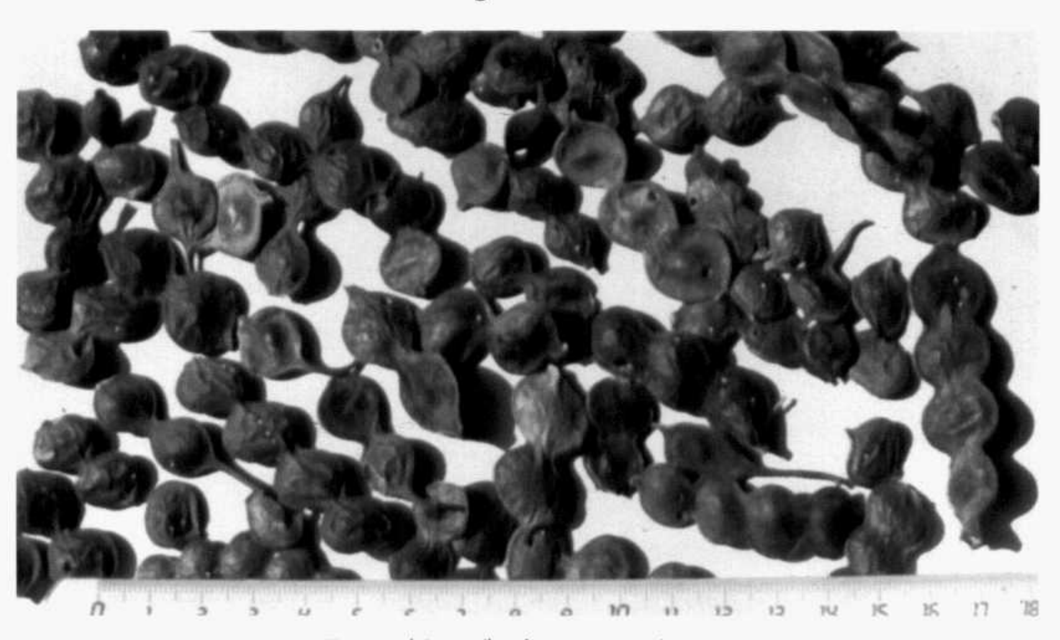
References:

Hedberg, Inga and Sue Edwards. 1989. Flora of Ethiopia. Vol. 3. Pittosporaceae to Arabiaceae. Addis Ababa and Asmara, Ethiopia ف Uppsola, Sweden

Plate 17

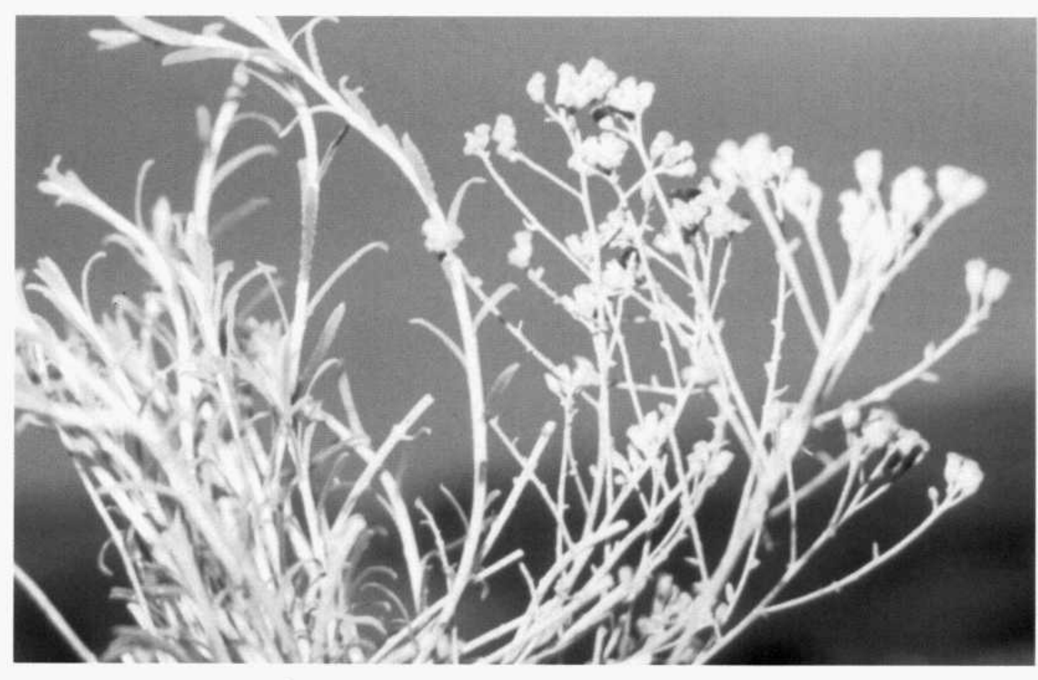


Acacia nilotica trees along the canal banks in the Nile Delta



Fruits (*Qarad*) of ***Acacia nilotica***

Plate 18



Dry heads of ***Achillea fragrantissima*** (*Qaisum*)



Flowering ***Adonis dentata***, Burg El Arab

Plate 19



Ambrosia maritima (*Demsisah*)



Crushed dried herb of ***Ambrosia maritima*** in the *attar* shop

Plate 20

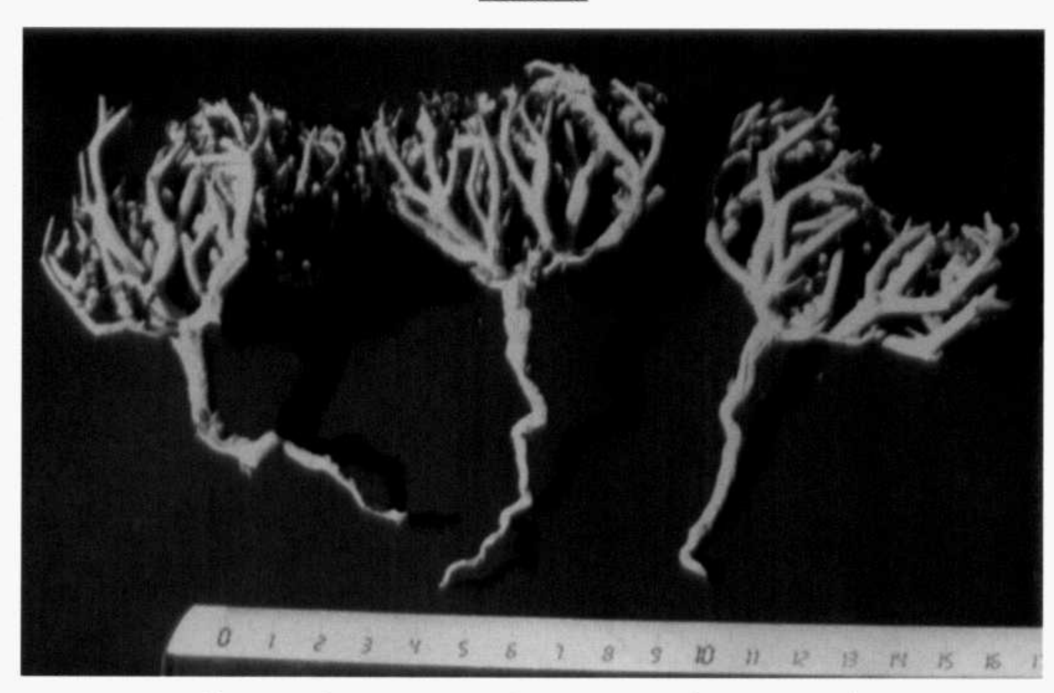


Anastatica hierochuntica flowering plant



Anastatica hierochuntica fruiting plant, starting to dry

Plate 21

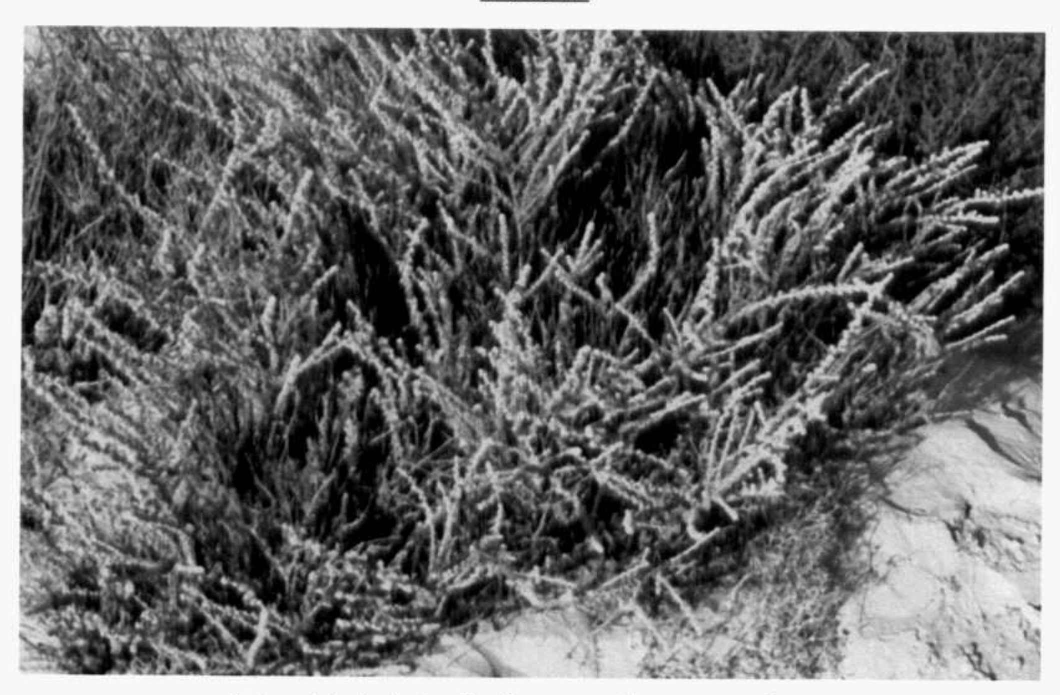


Dry woody ***Anastatica hierochuntica*** (*Kaff Maryam*)



Anchusa hispida, Burg El Arab, N. Coastal zone

Plate 22

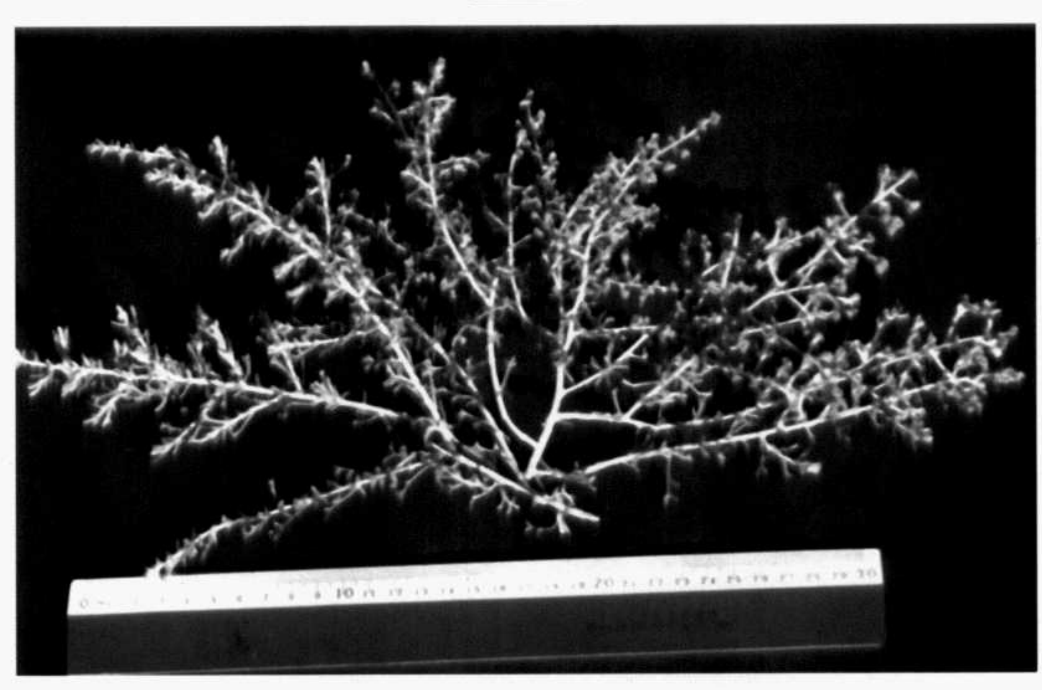


Artemisia judaica, leafy stage, the eastern desert



***Artemisia judaica*,** flowering stage, Sinai

Plate 23



Artemisia herba-alba herb (*shih*)



Artemisia herba-alba in the *attar* shop

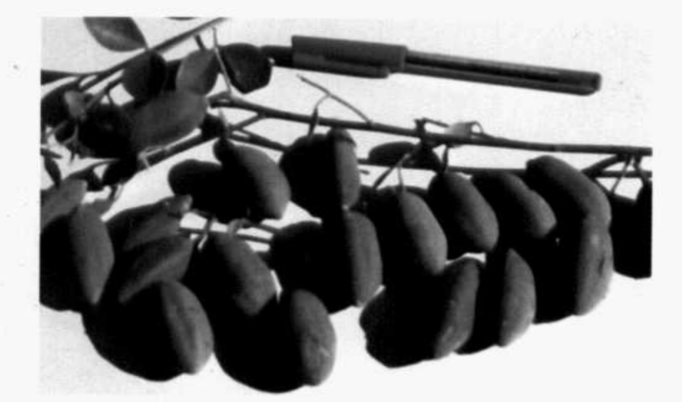
Plate 24



Balanites aegyptiaca tree, Halaib, S.E. Egypt



A branch of ***Balanites aegyptiaca***

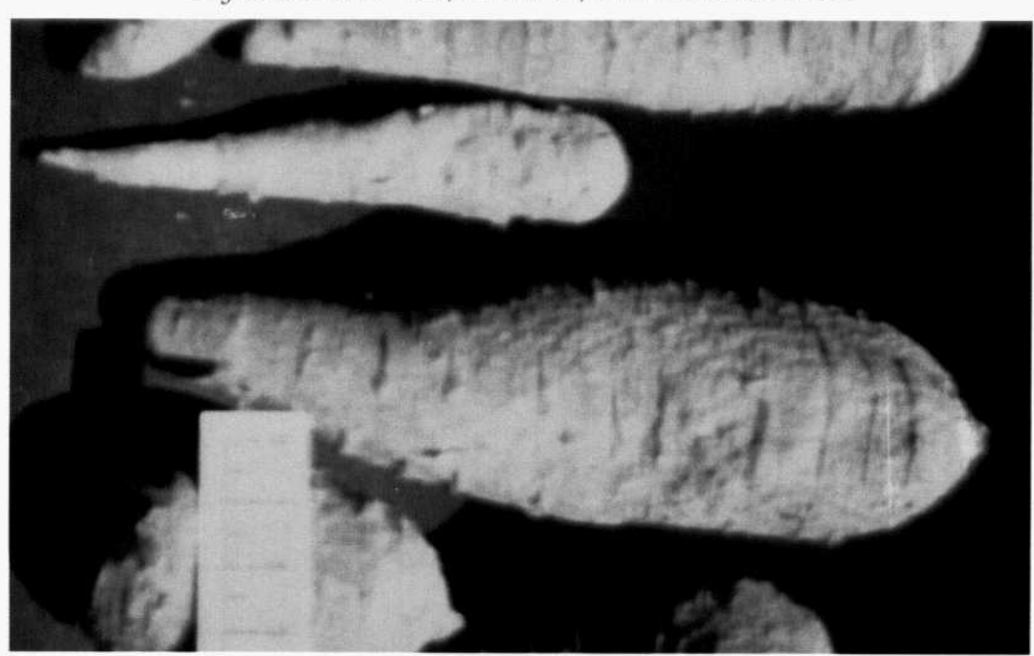


Fresh fruits of ***Balanites aegyptiaca*** (*Balah El Sukkar*)

Plate 25



Bryonia cretica herb, Sidi Kreir, N. West coastal zone

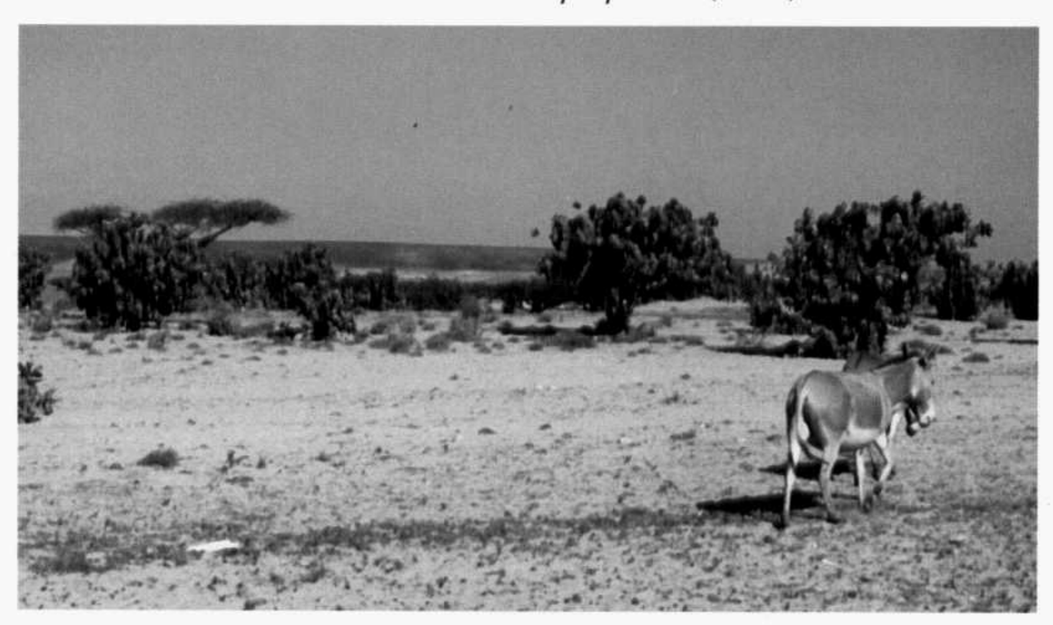


Bryonia cretica (*Léeba Murrah*) fleshy roots

Plate 26

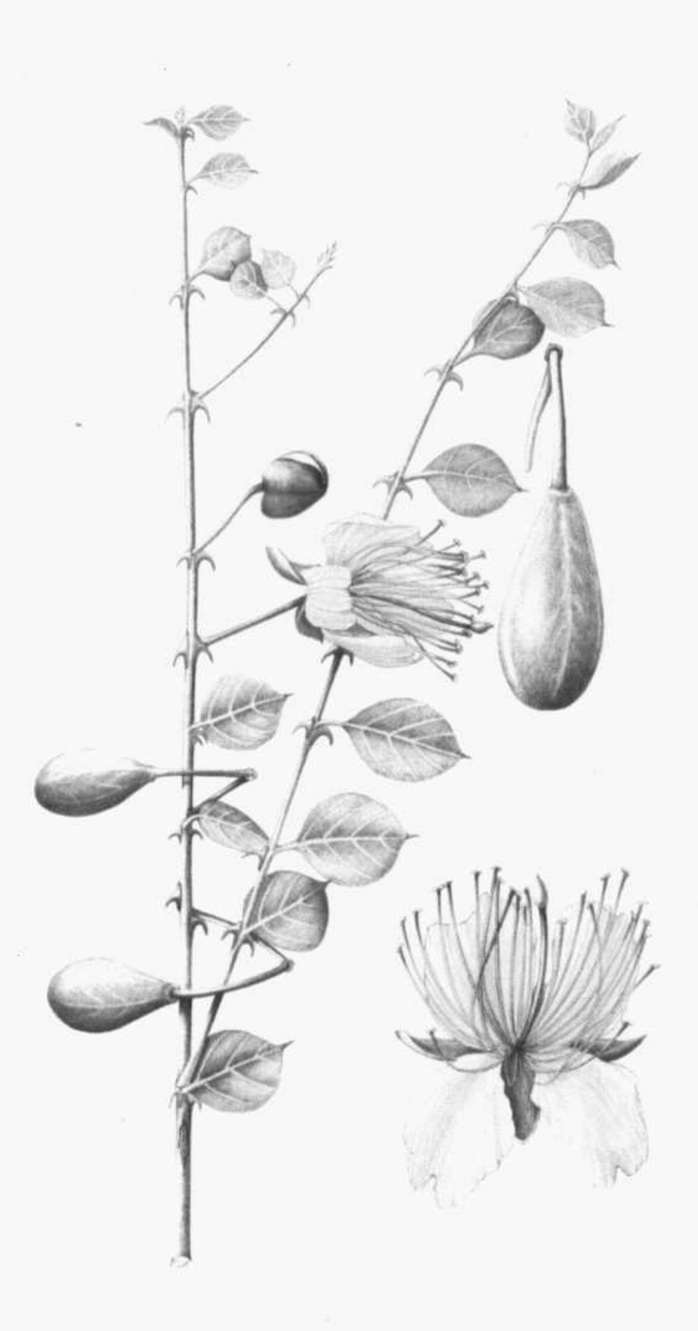


Inflorescence of ***Calotropis procera*** (*Oshar*)



Calotropis procera in the wadis of Red Sea zone, S. Egypt

Plate 27

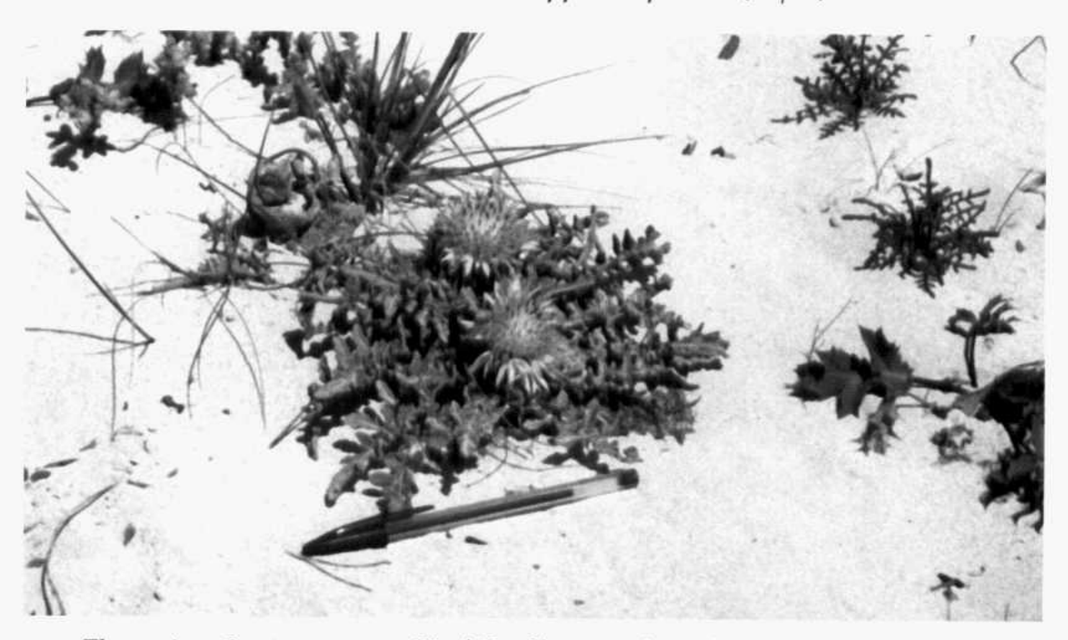


Capparis spinosa (*Lasaf, Kaber*)

Plate 28



Fresh flower buds of ***Capparis spinosa*** (*Caper*)



Flowering ***Centaurea pumilio*** (*Akash*), coastal sand dunes, Burg El-Arab

Plate 29

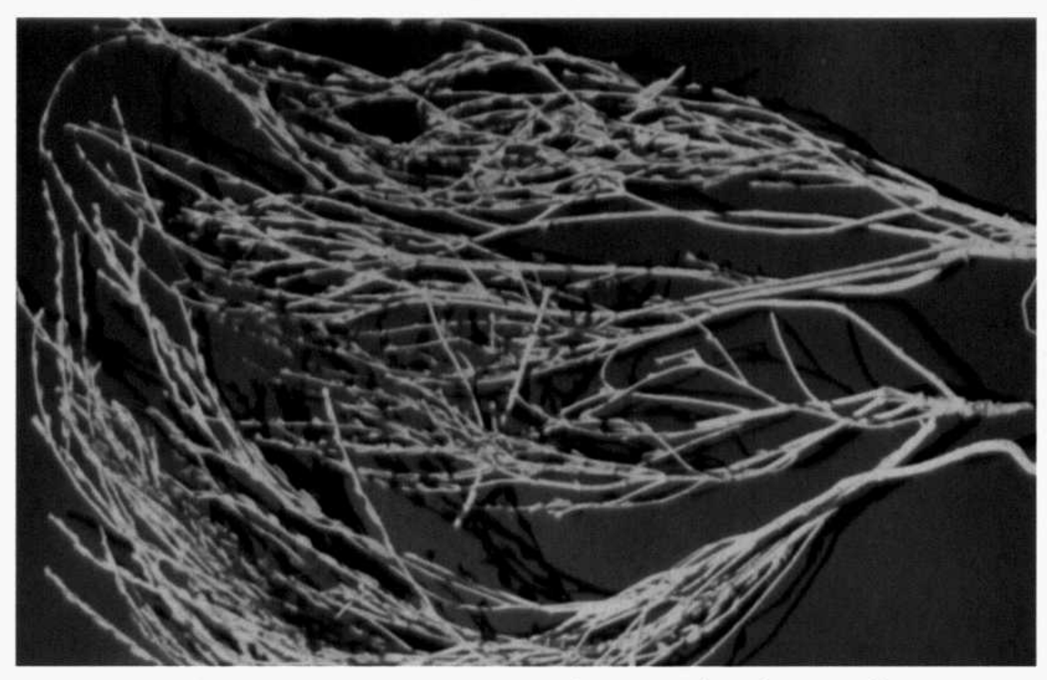


Centaurea pumilio plants with thick fleshy roots

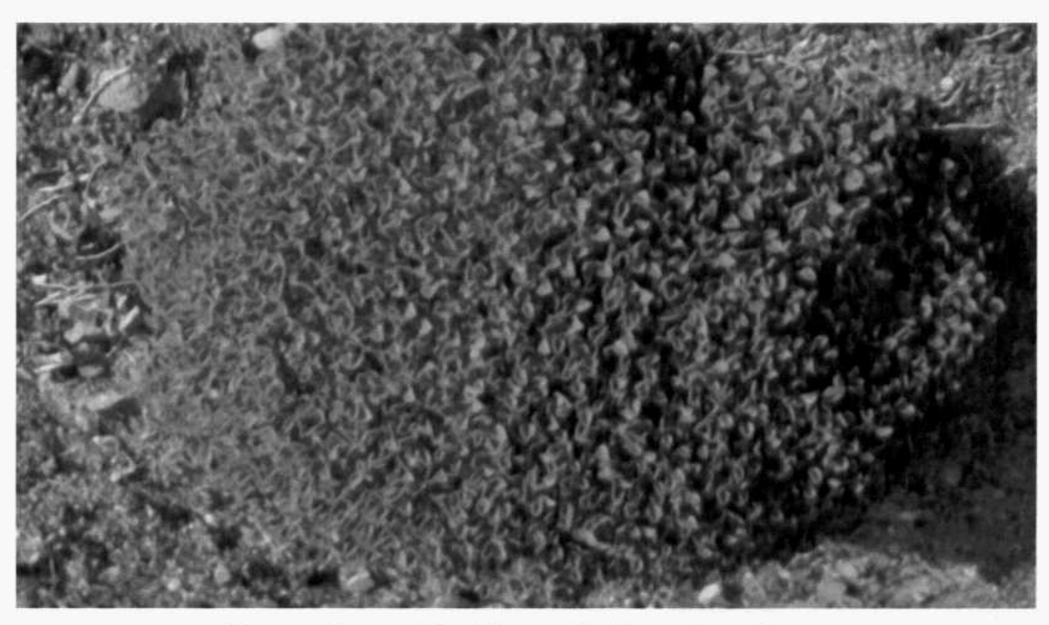


Akash (***Cantaurea pumilio***) sliced roots in the *attar* shop

Plate 30

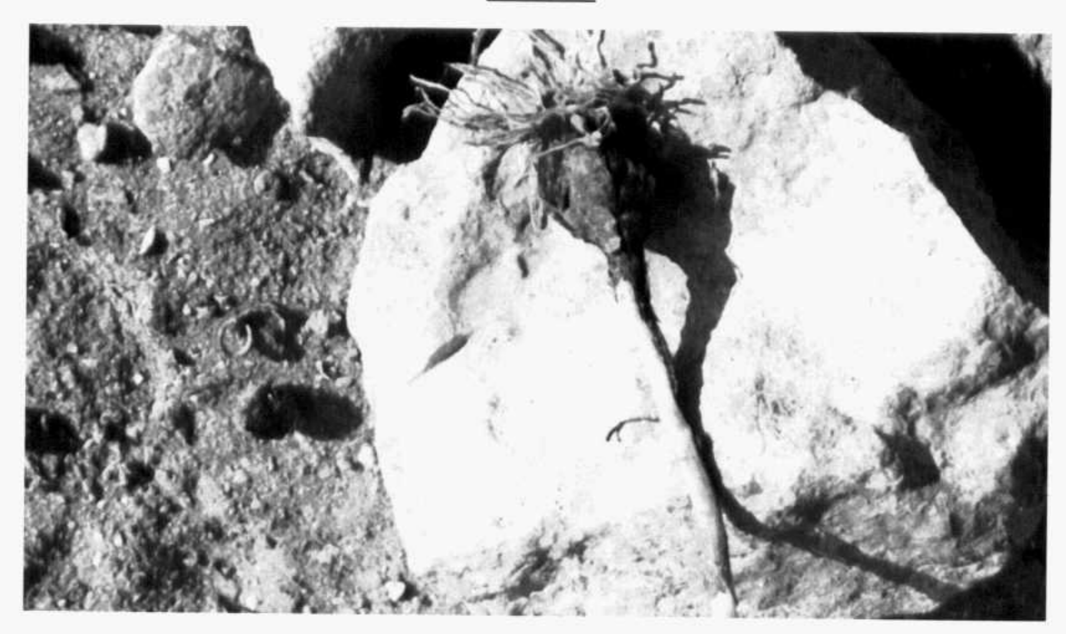


Dry fruiting ***Centaureum spicatum*** (*Qantarion*) in the attar shop

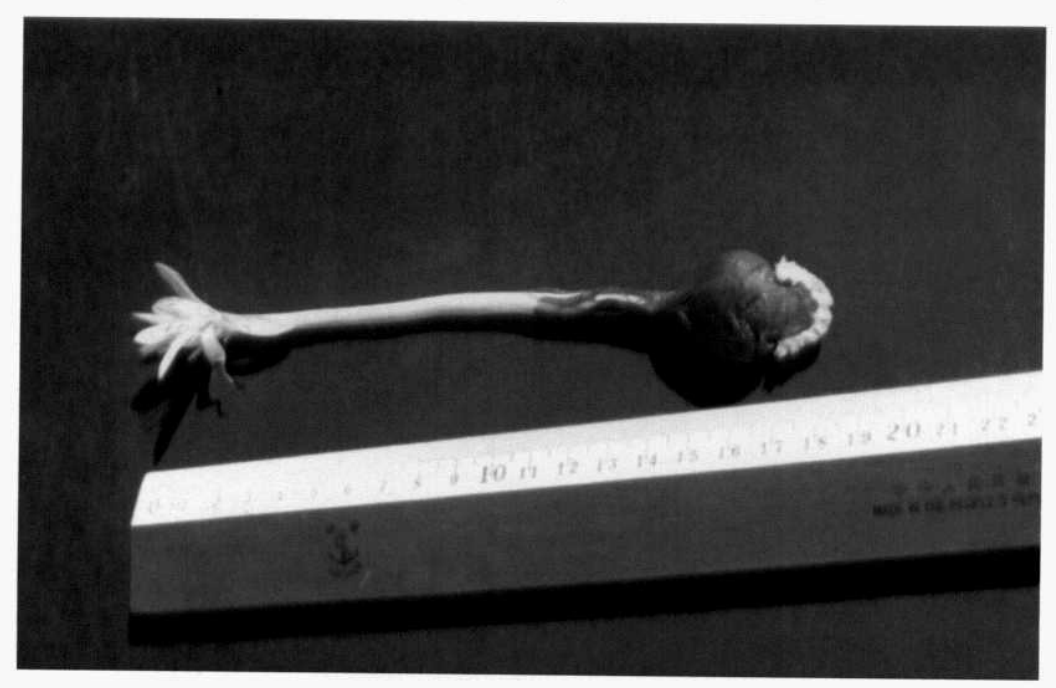


Cleome droserifolia (*Samwah*), the eastern desert

Plate 31

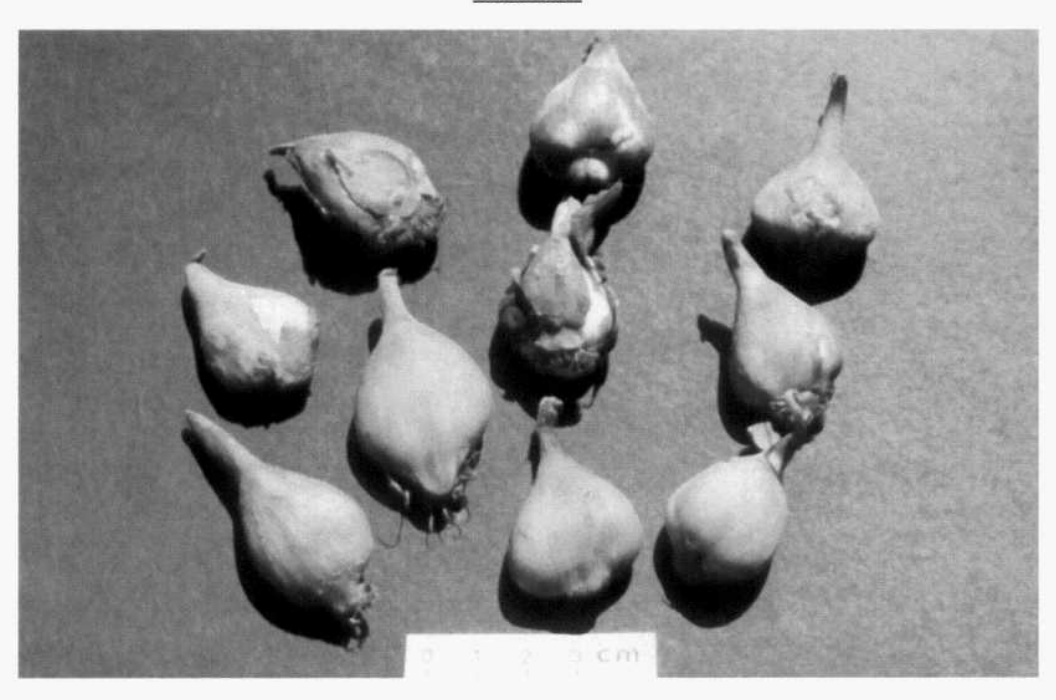


Colchicum ritchii, *Daba'a*, North Coastal Zone



Colchicum ritchii, flowering specimen, El Omayed, North. Coastal zone

Plate 32



Freshly collected corms of ***Colchicum ritchii*** (*Okna*)



Dried corms of ***Colchicum ritchii*** (*Okna*)

19. **Cymbopogon schoenanthus (L.)Spreng,** Spreng.;Pl.Pugill.2:14 (1815)

Andropogon schoenanthus L. (1753)

This species is represented in Egypt by two subspecies:
subsp. *schoenanthus* & subsp. *proximus* (A. Rich.) Maire & Weiller, Fl.Afr. Nord 1:287 (1952) (= *C. sennarensis* Hochst.; Flora 27: 243(1844); *C. proximus* A. Rich.; Tent. Fl. Abyss. 2:464 (1851)

Arabic	:	*Idhkhir*	إذخر
		Tibn makkah	تبن مكه
		Khilal ma' muni	خلال مأمونى

Berber : Tiberrimt.
English : Camel s hay,Scenanth, Geranium grass.
French : Citronelle, Jonc odorant, Jonc aromatique, Paille de la Mecque.
German : Cameleshov, Citronengras Schoenanthe.

Morphological Description:

Densely tufted perennial; culms erect, 60-130 cm high, enclosed at the base by tight bundles of old sheaths. Leaf-blades narrowly linear to filiform, up to 30 cm long, 1-3 mm wide, glaucous, asperulous. Spathate panicle oblong, 10-40 cm long; racemes 1-3 cm long, rachis-internodes and pedicels conspicuously white-woolly with hairs 3-4 mm long; pedicel of homogamous pair inflated, barrel-shaped, the lower raceme-base very short, about 1/3 as long as the pedicel (Plate 33).

Sessile spikelets narrowly lanceolate, 4-7 mm long; lower glume chartaceous, concave between the keels, glabrous or pubescent throughout, unwinged; upper lemma bidentate, the lobes up to 1/3 length of lemma body; awn 4.5-9 mm long, scarcely geniculate, the column weakly defined. Pedicelled spikelet 4-7 mm long (Plate 33).

Ecology:

The plant grows in stony habitats.

Distribution:

Local : Mainly in the Southern Eastern desert and Gebel Elba
Regional : All North African countries.
Global : Subsp. *schoenanthus*; N.Africa, the Arabian Peninsula, Somalia Djibouti, Pakistan, and India. Subsp. *proximus*: Eriteria, Ethiopia, westwards to Mauritania, Kenya, and Egypt.

Status:
The plant is collected to an extent making it endangered. In the southern part of the Eastern desert and Gebel Elba region, the plant is collected to be sold to the *Attarin* in the market. It is to be noted that huge amounts of this plant are collected from the Sudan and brought to Halaib (Plate 4). They are sold to the *Attarin* in Aswan and from there the plant is distributed to the different parts of the country.

The plant is endangered. It is to be noted that the ecology of reproduction of this species is not well understood. There is a great need to investigate the reproduction ecology of this species.

Part used:
Aerial parts of the plants

Constituents
It contains diterpenes, mainly poroximadiol.

Folk Medicinal Uses:
The plant is used as a weak infusion in the form of teas used for fever and jaundice. It is also used as diuretic, emenagogue, diaphoretic stomachic, carminative, tonic, antirheumatic, and as an antidiarrheal.

Pharmacological Actions, Indications, and Toxicity:
Extracts of the plant possess hypotensive, antispasmodic, antibacterial, analgesic and antipyretic activities.

References:

1- Duke, J.A. 1985. Medicinal Plants of China. Reference Publications, Inc. Michigan.
2- Rizk, A.M. 1986. The Phytochemistry of the Flora of Qatar. Scientific and Applied Research Centre. University of Qatar, Doha, Qatar.

20. **Cyperus rotundus L.**; Sp.Pl.;ed.1,45 (1753)

Chlorocyperus rotundus (L.) Palla, *Pycreus rotundus* Hayek

Arabic : *So'ad* السُعد

Berber : Azdjmir, Taselbou.
English : Nut-grass.
Frensh : Souchet rond
German : Runde Zyperwurzel
Italian : Stiancia rotonda, Cipero orientale, Padulina
Turkish : Topolak

Morphological Description :
A perennial herb with creeping rhizomes, which produce rows of small leaf-rosettes along the ground. Stolons thin, but here and there swollen into black ellipsoid tubers, which are collected as a drug. Stem, leafy only at base, upwards ending in a simple or compound umbel of spicate spikelets. The species is extremely variable with numerous subspecies and forms.

Rhizomes are in the form of ellipsoid tubers, black coloured, with characteristic aromatic odour and taste (Fig.10, Plate 34).

Ecology:
The plant is common in cultivated fields, along roads, usually on moist ground. It is considered as a weed causing problems for cultivated vegetables and crops.

Distribution:
Local : In all the phytogeographical regions of the country
Regional : North African countries
Global : Cosmopolitan

Status:
The plant is very common as a weed in the cultivated fields.The species is extremely variable and comprises numerous forms and subspecies.

Part used :
The rhizome in the form of ellipsoid tubers.

Constituents :
Starch, volatile oil (0.5%) and resin .

Folk Medicinal Uses :

Tubers are aromatic, stomachic in nervous gastralgia, dyspepsia, diarrhoea, emmenagogue, sedative, analgesic, in dysmenorrhea, amenorrhea, chronic neurtitis, and to increase body weight. They are used as infusion for treatment of intestinal pain, as carminative, stimulant, tonic, aphrodisiac, anthelmentic, analeptic, and to remove renal calculi. Fresh tubrers are diaphoretic, astringent and for scorpion stings.



Fig. 10- ***Cyperus rotundus*** **L.**
(After: Boulos, 1983, Medicinal Plants of North Africa).

21. **Juniperus phoenicea L.**; Sp Pl. ed.1, 1040 (1753).

Arabic : *'Ar'ar* عرعر

Berber : Zimeba, Aibs.
English : Phoenician juniper, Juniper tree.
French : Genevrier rouge, Fausse sabine, Petron.

Description:
Small shrub or tree, cypress-like tree with erect branches. Leaves, of 2 kinds, spreading needle-like and imbricated scale-like, with a characteristic aromatic bitter taste and aromatic odour. Fruit, glossy, reddish brown, 6-14 mm across, 3-9 ñseeded (Fig. 11, Plate 34).

Ecology:
The plant is a Mediterranean tree. It grows in the crevices of rocky mountains of North Sinai (Gebel Halal [892 m], Gebel El-Maghara [735m], and Gebel Yelleq [1087m]).

Distribution:
Local : Mountains of North Sinai.
Regional : All North African countries.
Global : The Arabian Peninsula, Southern Europe, Asia Minor and many other areas.

Status:
The plant is very rare and new seedlings are not observed in the sites of its growth. This means that the cut plants are not replaced by others. Recently, the few individuals are subjected to cutting for medicinal uses. It is an endangered species. Perhaps conservation *in situ* is efficient. The drug in the Egyptian market is mainly imported from Libya (Plate 34).

Part used :
The young twigs.

Constituents :
Volatile oil and resin

Folk Medical Uses :

Dry leaves are used to cure mild skin inflammations for babies; dilator for urinary tracts, laxative, intestinal disinfectant, emmenagogue, help childbirth by increasing the contraction of the uterus, diaphoretic, sedative and for diarrhoea.

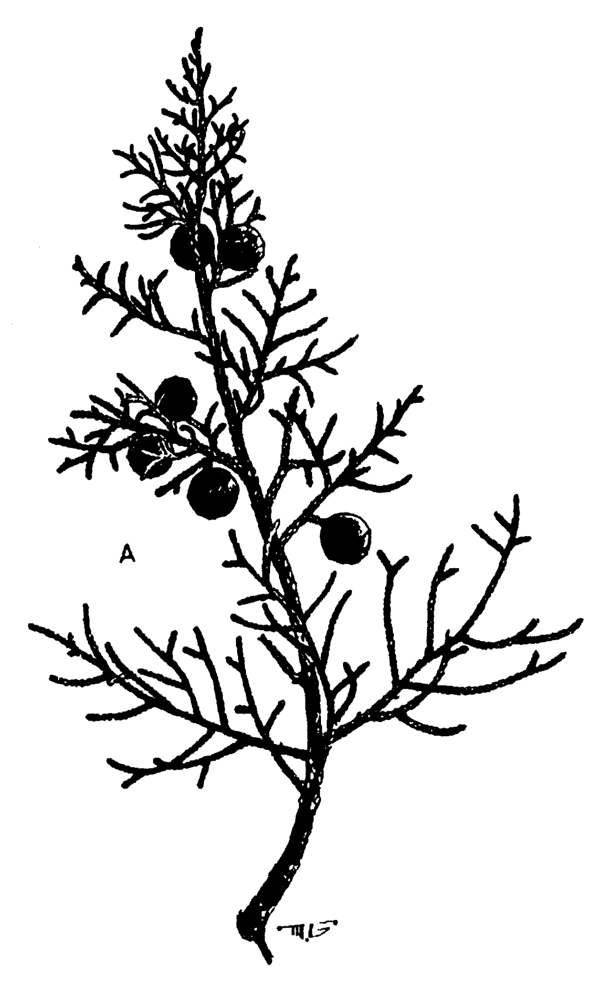


Fig. 11-*Juniperus phoenicea* L.
After: Boulos, 1983, Medicinal Plants of North Africa

22. **Moringa peregrina (Forssk.) Fiori**, Agr. Colon.; 5:59 (1911)
Hyperanthera peregrina Forssk, F1. Aegypt. Arab.
Moringa aptera Gaertner, Fruct. Sem. P1.2:315 (1775).

Arabic : *Habb El Yasar* حب اليسار

Habb El Ban حب البان

The seeds are known as *Habba Ghalia* حبة غالية

English : Ben-oil tree, Ben nut (seed) , Moringa
French : Ben blanc, Moringe Aptere, Arbre noix de ben
German : Behenbaum, Behennuss

Morphological Description :
A tree, 3-10 m high, with erect trunk, and white bark. Leaves, 30 cm long, imparipinnate with early deciduos leaflets. The leaf is formed of 3 pairs of long, slender junciform pinnae looking like opposite virgate branches. Leaflets, remote, small, oblong. The flowers appear before leaves in May. The pendulous pods ripen in October. The pod is pendulous and contains angled, nut-like white seeds (behen nuts) which are of bitter sweet taste and rich in oil (ben oil). Flowering and fruiting: February - April (Fig. 12, Plate 35).

Ecology:
The plant grows on steep slopes and precipitous cliffs of the mountains in Sinai and the Red Sea zone. The plant is confined to the feet of the mountains that are higher than 1300-1500 m above sea level.

Distribution :
Local : Sinai, South Eastern Desert, Red Sea region and Gebel Elba
Regional : No records in the other North African countries.
Global : Ethiopia to Somalia, northwards to the Sudan and eastwards to Arabia. Also recorded from Palestine and Jordan.

Status : Vulnerable.

Part Used :
Seed and oil obtained from the seeds.

Constituents:
Oil similar to olive oil in its fatty acids composition.The refined oil obtained from the seeds has a yellowish colour, a sweet taste and is odourless, for which it is much esteemed for perparing cosmetics. The oil known as *Oleum Behen Balaninum* is pharmacopoeial in many pharmacopoeias.

Folk Medicinal Uses:
To treat headache, fever, abdominal pain and constipation, burns, back and muscle pains and during labour in childbirth. The ben oil has been used by the Egyptians since Old and Middle Kingdoms (3000-2000 B.C.)

References :

1- Miller, A.G. and Morris, M. 1989. Plants of Dhofar, the Southern Region of Oman. Traditional economic and medicinal uses. The Office of the Advisor for Conservation of the Environment, Diwan of Royal Court, Sultanate of Oman.
2- Morton, T. 1991. Economic Botany. **45** (3): 318-333.



Fig. 12- ***Moringa peregrina*** **(Forssk.) Fiori**
(After: Täckholm, 1974, Students' Flora of Egypt)

23. **Origanum syriacum L.** Sp.Pl.;ed.1,590 (1753)

Origanum viridis L.; Sp.Pl.;ed.2,804 (1763),
Mentha undulata Willd.; Enum. Pl.Hort. Berol. 608 (1809).

Arabic : *Bardaqoash* بردقوش

Za'atar زعتر

Morphological Description :
Leaves, nearly sessile, green, densely hairy, about 1 cm long, and 0.5 cm broad, with characteristic aromatic odour (of thyme smell) and taste. Bracts, small, 4-ranked, white-canescent. Flower heads, often cylinrical, panicled (Plate 35)

Ecology:
The plant is rare and grows in rocky habitats in the mountains of Sinai

Distribution:
Local : Sinai
Regional : Only in Egypt
Global : The countries of the Middle East.

Status:
The plant is vulnerable. It is collected for medicinal uses and to prepare hot tea. The plant needs conservation; both *in situ* and *ex situ*.

Part used :
The leaves or the whole herb.

Constituents:
Volatile oil consisting of more than 80% carvacrol, resin and flavonoids.

Folk Medicinal Uses :
Dry leaves are used as spice, condiment and to relieve pain. Fresh herb is used with sesame seed and olive oil with sugar to make a special dish. Hot tea is used for chest diseases.

24. **Peganum harmala L.**; Sp.Pl.;ed.1, 444 (1753)

Arabic	:	*Harmal*	حرمل
		Sadhab barri	سذب برى
		Ghalgat edh dhi' b	غلقة الذئب

English : Harmel, Syrian rue, Wild rue.
French : Hermale, Harmel, Rue Sauvage.
German : Gemeine syrische Raute, Wild Raute.

Morphological Description:
A glabrous perennial plant with numerous herbaceous forked-corymbose stems from a shrubby base, 75 (-100) cm tall. Leaves, sessile, 6 (10) cm long, irregularly dissected with acute linear lobes. Flowers, large, terminal, soliary pedicellate and white in colour. The inflorescence is a cymose which is a compound monochasial scorpioid. The pedicel is angular and green in colour. The flowers are actinomorphic, hermaphrodite. The fruit is a stalked 3-valved loculicidal capsule derived from trilocular superior ovary. The fruit is globular in shape, 6-10 mm in diameter. It contains numerous small dark brown, reticulately pitted, 3-4 mm long seeds arranged on axile placenta (Fig. 13 , Plate 36).

The plant flowers from April to October and bears fruits from April to November

Ecology:
The plant is common in the northern coastal region, where it grows in neglected areas and disturbed ground as well as along the roads. It occupies niches that receive runoff water in addition to the recorded rainfall. The plant, being unpalatable, is not affected by grazing. However, the human activities affecting its habitat would be the main reason of the disappearance of the plant from many localities.

Distribution:
Local : The Mediterranean coastal strip from El-Salloum to Rafah. The Isthmic desert, Sinai
Regional : All the North African countries from Egypt to Morocco.
Global : South Europe, Asia Minor,Middle east, South Russia, Iran, Afghanstan, Pakistan,Kashmir, Tibet, India, Mexico, Western Asia, North and Latin America.

It is considered as a common cosmopolitan weed of waste places, occurring in arid and semi-arid regions up to 4000 m.

Status:
The plant is not endangered. However, there is a great need to investigate the methods of cultivating the plant to satisfy the needs for folk or other uses.

Part used:
The dried ripe seeds of *Peganum harmala* L.(family *Zygophyllaceae*). Sometimes, leaves and flowers are also used.

Constituents:
Lipids (13.3%), β-sitosterol and α-amyrin, harmine, harmaline, harmalol and peganine.

Folk Medicinal Uses:
Leaves and flowers are used for rheumatism and stomach problems. Seeds are used as an anthelmintic and as a narcotic.

The leaves are rubbed on joints for rheumatic pain. A tea made from leaves is used as an anthelmintic. A tea made from blossoms is taken for stomachache. Ground seeds mixed with senna and honey are used for stomach ache, or mixed with black pepper and applied on painful joints. Seeds are powdered and a decoction made with water taken orally as a vermifuge, narcotic and for removing kidney stones. In far east countries (mainly in Pakistan) powdered seeds are used for asthma, colic, jaundice and as an anthelmintic against tapeworms. A decoction of seeds is given for laryngitis. It is also recorded to increase the flow of milk in new mothers; also used as abortifacient. The smoke is considered antiseptic and wounds are fumigated by burning seeds and leaves and letting the smoke pass over them.

Pharmacological Actions, Indications and Toxicity:
Extracts prepared from various organs of the plant were inactive against Ehrlich ascites carcinoma *in vitro.*

Extracts containing harmine were active against *Bacillus subtilis, Staphyllococcus aureus* and *Escherichia coli.*

Seeds possess undoubted hallucinogenic compounds and said to be aphrodisiac, anthelmintic, lactagogue, stimulant to CNS followed by paralysis, emetic, diuretic, vapors of burnt plant for headache, heamorrhoids, depurative, rheumatism, analgesic, alopecia, asthma, roasted seeds for indigestion and diabetes, infusion of seeds for cardiac disorders.

Authentication:

1- Macro and microscopically.
2- Alkaloid not less than 15% in seeds.
3- Foreign organic matter not more than 2%.
4- Loss on drying not more than 10%.
5- Ash not more than 10%.

Reference :

1- Hilal, S.H.; Haggag, M.Y.; Soliman, F.M. and El-Kashoury, S. 1978. Alkaloids of *Peganum harmala* L. Egypt. Pharm.Sci. **19(1-4)**:393-399.

2- Hilal, S.H.; Zedan, H.H.; Haggag, M.Y.; Soliman, F.M. and El-Kashoury, E.A. 1979. The antimicrobial and anticancer activity of *Peganum harmala* L. Egypt. J. Pharm.Sci. **20**:193-197.

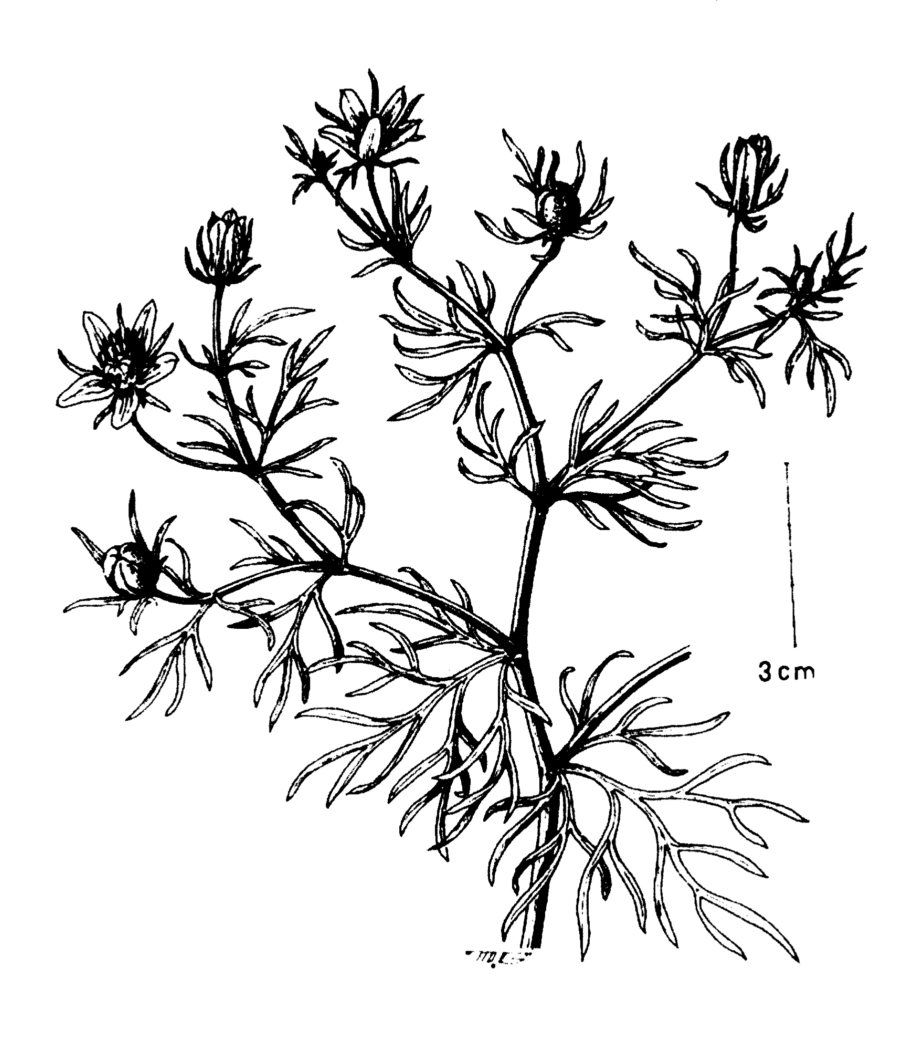


Fig. 13- ***Peganum harmala*** **L.**
(After: Boulos, 1983, Medicinal Plants of North Africa).

25. **Pluchea dioscorides (L.) DC.**; Prodr. 5:450 (1836)

Baccharis dioscorides L.;Cent. Pl. 1:27 (1755)
Conyza dioscoridis (Linn) Desf.;Tabl. Ecol. Bot. Ed,114 (1815)
Baccharis aegyptiaca Forssk. Ex DC.; Prodr. 5:450 (1836)

Arabic : *Barnoof* برنوف

English : Ploughman s spikenard
French : Conyze
German : Doerrkraut
Italian : Coniza
Turkish : Barnuf, Kenevir otu

Morphological Description:
Richly branched hairy shrub, often 2-3 m high, with lanceolate acute, serrate leaves. Heads numerous, corymbose, terminating the leafy branches. Flowers pale yellow or pink (Plate 37).

Ecology:
The plant grows on fine loamy soils in moist habitats, especially along the canals, the streams and the Nile branches.

Distribution:
Local : Mainly in the Nile region. It occurs in the Mediterranean region, the oases, and parts of the north Arabian desert.
Regional : Egypt
Global : Tropical Africa, Saudi Arabia, Palestine.

Status:
The plant is common.

Part Used:
The aerial parts of the plant.

Constituents:
A crystalline bitter principle "conyzin" from the leaves. P-a-hydroxysantamarin, santamarin, 11-b, 13-dihydro, P-a-hydroxysantamarin, P-angiloyloxy ludovicin, p-isovaleryloxy ludovicin, 3-methylvaleryloxy ludovicin. 1-b-angeloyloxy-q-A-hydroxy-A-cyclocostunolide. Quercetin-4-methylether and quercetin-3-xyloside, quercetin, quercetin-7-arabinoside and quercetin-3-rhamnoside, 3-7-disulphates

of quercetin, isorhamnetin, kaempferol-3-rutinoside, quercetin-3-O-b-D-glucoside, apigenin-6, 8-di-C-glucoside.b-amyrin, b-amyrin acetate. Octacosanol, hexacosanol, tetracosanol. Stigmasterol, campesterol, cholesterol. A volatile oil.

Folk Medicinal Uses:

Ibn El Bitar and Al Antaki reported the use of *Barnoof* in the treatment of epilepsy in children, in colic, as carminative and as remedy for cold.

A *Conyza* species, namely, *C. figinoids* DC (Hiero) is used in Mexico in the treatment of certain types of tumors. The plant is used in the treatment of diarrhoea, colic and rheumatic pains.

Biological Activities:

The following biological activities were reported for certain *Conyza* species, other than *C. dioscoridis*:

1- Insecticidal activity exhibited by the aqueous extract of *Conyza chinensis* towards american cockroach and house fly.
2- Insect repellent activity demonstrated by fresh leaves of *C. lyrata* towards mosquitoes.
3- Slight antibiotic action shown by extract from *C. cinerea* L.
4- Molluscicidal activity demonstrated by extract from the twigs of *C. pauciflora* Willd.

Economic Potential:

The plant has good reputation in folk medicine. Its marketing is local and depends on collection from the wild.

References:

1- Boulos, L.and El-Hadidi, N. 1984. The Weed Flora of Egypt. The American University Press, Cairo.
2- El Hefnawy, H.M. 1990. A Pharmacognostical study of certain *Conyza* and *Cosmos* species (Family Compositae) growing in Egypt, M. Pharm. Thesis, Faculty of Pharmacy, Cairo University.
3- Ibn El Bitar.1890. "Mofradat Al Adwiah wal Aghzia" , Boulac Press, Egypt.
4- Saleh, M.R.I. 1957. Isolation of a crystalline "conygin" from the leaves of *Coyza dioscorides* Desf. Egypt. Pharm. Bull. **39 (13)**: 107.

26. **Posidonia oceanica (L.) Del.**;Descr. Egypte, Hist. Nat. 78 (1814)

Zostera oceanica L.; Mant. 123 (1767)

Arabic : *Rigle Al Asad* رجل الأسد

Morphological Description:

Submerged robust marine plant with thick fibrous creeping rhizomes and long, strap-shaped rosetted leaves upto 50 cm long, 7 mm broad, with round apex and brown empty basal leasf sheaths soon becoming fibrous. Inflorescence peduncled, consisting of several spikes with large bracts. Flowrs naked, partly male, partly bisexual of three stamens and a pistil. Fruit a detached and floating drupe, indehiscent or splitting from the base into 2-3 valves.

The leaves are constantly washed up on the beach together with peculiar felt balls "*pilea marinae*", formed by their fibre by the action of ther waves (Fig. 14, Plate 37).

Distribution:

Local : Along the western Mediterranean coast, the fibrous balls are common on the white pseudo-ooitic sand dunes.

Regional : Along the coast of the North African countries

Global : In the Mediterranean Sea.

Folk Medicinal Uses:

The dried herb is sold in the Attarin shops in Cairo. However, the sellers do not give clear answers about its uses.This plant needs further investigations. It is said that it used in treating obesity.



Fig. 14- ***Posidonia oceanica*** **(L.) Del.**
(After: Täckholm, 1974, Students' Flora of Egypt).

27. **Primula boveana Duby**, in A.DC.; Prodr.; 8:35 (1884).

An Endemic Species in Sinai.

English : Paigle, Peagle.
French : Primeyere.
German : Aurikeln.

Morphological Description :

A perennial herb with thin, sharply incised serrate leaves. The leaves are mealy beneath, the lowermost rosetted, the upper ones in distant whorls; both surviving throughout the year. Flowers, lemon- coloured appearing from February to May, occasionally even in summer. Seeds minute and referred to as ìdust seedsî. The plant is rare, endemic to Sinai Region where it grows near wells in Gebel Musa, Gebel Safsaf, Gebel Serbal and Gebel Umm Shaumar, mainly in north- facing hills.

Habitat :

Rocky ridges and mountains in Sinai.

Distribution :

Endemic, recorded only in Sinai, Egypt.

Parts Used :

a. The flower

Latin : Flores Paralyseos.
English : Paigle(s), Peagle.
French : Fleurs de PrimevÈre officiale.
German : Primelbluten, Schlusselblumen.

Obtained from *Primula veris* L. (syn. *P. officinalis* (L.) Hill) or *P. elatior* (L.) Hill.

The drug consists of either the entire flowers or only of the petals, stamens and ovaries. Corolla, 15 mm long tube, light yellow to brownish with lemon- yellow margin, terminates in 5 obcordate lobes (after soaking with water) which have an orange yellow spot at the base that fades on drying,

Margin and lobes may be partly green. Calyx, greenish-brown with 5 prominent ribs and short pointed teeth. Odour, faint, characteristic, reminiscent of honey; taste, faintly sweetish.

b. The root

Latin	: *Rhizoma Primulae, Radix Paralyseas.*
English	: Primula Root.
French	: Racine de PrimevËre officinale.
German	: Primelwurzel, Schlusselblumen Wurzel.

Obtained from *Primula veris* L. (syn. *P. officinalis* (L.) Hill) and *P. elatior* (L.) Hill.

The drug consists of rhizomes and roots. Rhizome, 2-5 mm thick, 1-5 cm long, densely covered with roots, greyish brown, tortuous, verrucose and tuberculate. Roots, 1mm thick, several cms long, whitish yellow or pale to reddish brown, brittle, with inconspicuous longitudinal grooves. Odour, faint, characteristic, reminiscent of methyl salicylate (*Primula elatior*) or anise (*Primula veris*). Taste, obnoxiously irritating.

Constituents :

A-Flower :

Small amounts of sponins (mainly primula acid) in the sepals (up to 2%). Flavonoids in other parts of flower comprising gossypetin, kaempferol dirhamnoside and 3- gentiotrioside, quercetin. Carotenoids. Traces of essential oil. enzymes (primverase).

B- Root :

Five to ten percent triterpenoid saponins. Phenolic glycosides, especially primulaverin (primulaveroside) which on enzymatic degradation (during drying) yields the characteristic aroma substances of the plant (e.g methyl -methoxy-salicylate). Rare sugars and sugar alcohols. Small amount of tannin.

Pharmacopoeias :

- DAB 10 (1991/1992)- BHP (1993)- OAB

Authentication :

A-Flower :

1- Macro- and micromorphology.
2- TLC for flavonoids.
3- Green flowers not more than 30 %
4- Ash not more than 8%.
5- Foreign matter not more than 2%
6- Loss on drying not more than 12%

B-Root :

1. Macro- and micromorphology.
2. TLC for saponins.
3. Foreign matter not more than 2%
4. Loss on drying not more than 10%
5. Ash not more than 11 %

Adulterants and Substitutes :

A- Flower :

The flowers of *P. elatior*.

B-Root :

Roots and rhizomes of Vircetoxicum hirundinaria Medikus. (syn. *V. officinale* Moench) (*Asclepiadaceae*) colour detected by tests and TLC.

Folk Medicinal Uses:

A- Flower :

As a nervine for headache, neuralgia, shaking of the limbs, as a "heart tonic" in vertigo and cardiac weakness.

B-Root :

As secretomotor and secretolytic expectorant in bronchitis, catarrh of the respiratory tract, coughs, colds and phlegm in the broncho-pulmonary system.

References :

1- Langhammer, L.1964. Dtsch. Apoth. Ztg. **104:** 1183.
2- Stahl, E.1973. Arch. Pharm. (Weinheim) **306**: 693.
3- Wagner, H.; Bladt, S. and Zginski, E.M. 1984. Plant Drug Analysis, Springer Verlag, Berlin, Heidelberg, New York, Tokyo.

28. **Rumex vesicarius L.**; Sp.Pl.; ed. 1, 336 (1753)

Arabic : *Hommad* حماض

Henbiet حنبيط

Berber : Brisemmou , Tasemmunt
English : Sorrel, Bladder dock
French : Oseille suavage, Oseille d Amerique
German : Amerikanischer Sauerampfer
Italian : Acetosa d America, Romice d America
Turkish : Humed Otu

Morphological Description:
An annual, glabrous herb, with erect to ascending stem, branching from base. Leaves fleshy, petiolate, ovate-deltoid, obtuse, entire. Flowers, bisexual, greenish to purplish. Fruit, perianth winged, entire, purplish-red-veined. Flowers from March to April (Plate 38).

Ecology:
The plant grows in sandy habitats. It occurs usually in depressions, especially along roadsides, where runoff water collects with the fine sandy deposits.

Distribution :
Local : All over the different phytogeographical regions of Egypt.
Regional : All the North African countries.
Global : Widespread, especially in Arabia.

Part used :
The entire plant

Constituents:
It contains flavonoid C-glycosides: Vitexin, Isovitexin, Orientin and Iso-orientin, and the anthraquinones: Emodin, and Chrysophanol.

Folk Medicinal Uses:
It is used for hepatic diseases, constipation, calcules and bad digestion. It is cooling, laxative, stomachic, tonic and analgesic. It is used for heart troubles, pains, tumors, diseases of the spleen, hiccough, flatulence, asthma, bronchitis, dyspepsia, vomiting, piles, scabies, leucoderma, toothache, appetizer and diuretic.

Substitutes :

The whole plant of *Rumex pictus* Forssk. which is a small often procumbent, reddish plant with pinnatifid lower leaves. Flowers, in a leafless terminal raceme. Fruit perianth, winged. *R. pictus* is an esteemed green vegetable in the Arab Gulf countries. It is collected in spring time and eaten fresh.

References:

1- Rizk, A. M. and El Ghazaly, G. A. 1995. Medicinal and Poisonous Plants of Qatar. Univ. of Qatar, Doha.

29. **Salvadora persica L.**; Sp.Pl.; ed. 1,122 (1753)

Arabic	:	*Arak*	أراك
		Meswak	مسواك
		The fruits are known as *Kabath*	كباث

Berberer : Tidjat, Adjou, Abisga, Babul
English : Toothbrush tree
French : Arac, Meswak
German : Senfkom
Turkish : Arak

Morphological Description:
Glabrous shrubs, as man's height or more, with white branches. Leaves oppop-site, short-petioled, acute entire, coraceous, oblong, 5-8 cm long, glabrous. Racemes form a spike-like panicle. Calyx bell-shaped; corolla yeflowish-red, twice as long as the calyx, with revolute lobes (Plates 38 & 39).

Part Used:
Pieces of the underground stolons (sometimesd the branches) of variable size (5-20 cm long, 0.5-1.5 cm diametre) with buff to bright brown colour and pungent characteristic taste when fresh, known as siwak or miswak (Plate 38).

Constituents:
Sulfur glycosides.

Folk Medicinal Uses:
It is used for gonorrhoea, spleen, boils, sores, gum disease and stomach ache. It is used for bites of poisonous animals. The wood boiled in oil and used as linament for contusions. Leaves are used antisyphiltic. Leaves, roots, bark and flower contain a diuretic oil. Fruits are edible, stomachic, carminative, febrifuge and appetizer.

The use of the miswak is recommended by the **Prophet MOHAMMED** (Peace be upon Him), specially before each prayer of the five prayers every day. The recent studies proved its efficiency in cleaning the mouth, teeth and gums. Some companies produced tooth-paste preparations containg the extract of the arak, called in the market as ***Miswak*** (see Batanouny, 1986).

30. **Solanum nigrum L.**; Sp.Pl.;ed.;1,186 (1753)

Arabic	:	*Enab edh dhi'b*	عنب الذئب
		Enab eth tha'lab	عنب الثعلب
		Rbriq	ربرق

Berber : Touchanina, Tiourmi, Azouri imouchene.
English : Black nightshade, Hound's berry.
French : Morelle noire, Amourette, Creve chien.
German : Schwarzer Nachtschatten.

Morphological Description
An annual herb, up to 40 cm high (sometimes upto 1 m), with spreading branches; stems mostly smooth or younger ones slightly hairy. Leaves are alternate to each other; oval-shaped and narrower at each end with mostly smooth edges. Flowers are rather unique, wheel-shaped, white or yellowish white and umbrella-shaped as they hang from plants. Fruits are round, fleshy dark voilet berries, about 6 mm in diameter (Fig. 15, Plate 40).

Ecology:
The plant is a weed growing in moist places in gardens and orchards. In regularly irrigated fields, the plant attains heights of one metre.

Distribution:
Local : The plant has a wide geographical distribution in Egypt. It grows in all the phytogeographical regions of the country. It should be noted that it is very common in irrigated areas, especially the Nile Delta in the Nile Valley. Newly reclaimed lands in the desert are infested by this weed.
Regional : All the North African countries.
Global : A cosmopolitan weed

Status:
The plant is widespread and is not endangered.

Part used:
Leaves and green unripe fruits.

Constituents:

The plant contains solasodine glycosides. Solanine, solamargine and other solanigrines which are steroidal in nature. The berries contain 15-20% glucose and fructose, vitamin C and carotenes. Unripe berries are reported to be poisonous, while ripe berries are edible.

Folk Medicinal Uses

Leaf, root and stalk used for cancerous sores, leucoderma and wounds. Stem: young shoots eaten as pot herb, considered tonic for virility in men and for dysmenorrhea in females, for dysentery, sore throat, whitlow.

Plant, diuretic, febrifuge, decoction of the whole plant for abscesses, cancer of the cervix inflammation, leucorrhea and open sores, for dermatitis, diarrhea, heavy female discharges, and sore throat. Berries, narcotic, analgesic, if used externally sedative, seeds aphrodisiac (mixed with food).

Toxicity

Unripe fruits are poisonous. In both man and animal the toxic symptoms are stupefaction, staggering, loss of speech, feeling and consciousness, cramps, dilation of the pupil and sometimes convulsions. Death is rare and is apparently by respiratory paralysis.

References :

1- Bliss, B. 1973. Chinese medicinal herbs. Georgetown Press, San Fransisco.
2- NAS.1975. Herbal pharmacology in the Peopleís Republic of china. A Trip Report of the American Herbal Pharmacology Delegation.National Academy of Sciences, Washington D.C. 269 pp.
3- NIH. 1924. A Barefoot Doctor's Manual [Translation of a Chinese instruction to certain chinese health personnel]. John E. Fogarty International Center. National Institute of Health, Washington, DC. DHEW publication No (NIH) 75-695.
4- Perry, L.M. 1980. Medicinal Plants of East and Southeast Asia , 620 pp, MIT Press. Cambridge, Mass.
5- Saber, A.H.; S.I. Balbae and A.V. Zaki. 1963. A contribution to the phytochemical study of *Solanum nigrum* L. Bull. Fac. Pharm., Cairo Univ. **2 (1)**.



Fig. 15- ***Solanum nigrum*** **L.**
(After: Siddiqi, 1978, Flora of Libya, No. 62, Solanaceae)

31. **Solenostemma arghel (Del.) Hayne**, Getrue Darstell.Gew. 9,t.38 (1825)
Cynanchum oleifolium Nectoux, Voy. Egypte 20 (1808)
Solenostemma oleifolioum (Nectoux), Bullock & E.A. Bruce, Kew Bull. 8:329 (1953)

Arabic : *Harggal* حرجل

Berber : Khallachem, Zellechem, Arellachm
English : Argel, Arghel
French : Solenostemma, Arguel
German : Arghelsenna
Italian : Solenostemma
Turkish : Argal

Morphological Description:
Erect perennial undershrub, reachinmg up to 60 cm high. Leaves opposite, decusasate, lancolate to oblong-ovate, with acute to subacute apex, cuneate base. The inflorescence is cymose. Bracts broad, linear-lanceolate, acute. Flowers white. Fruit a follicle, 5 cm long, 17-18 mm broad, ovoid lanceolate and acuminate at the apex. It is very hard and dark purple. Seeds are turgid, ovoid, channelled down one face, minutely tuberculated, bearinmg one apical tuft of hairs (Plates 40 & 41).

Ecology:
The plant grows on pebbly and gravelly habitats in the wadis of Sinai and the Southern Estern Desert.

Distribution:
Local : Sinai and the Southern Eastern (Arabian) Desert
Regional : Egypt, Libya and Algeria,.

Status:
The plant is endangered. It is heavily collected from its natural habitats to be sold in the *Attarin* shops all over Egypt. Large amounts of the leaves are imported from Sudan. Due to the fact that it became rare in Sinai due to overcollection, the native healers (doctors) use the leaves of *Gomphocarpus sinaicus* instead of the arghel leaves. They call both *hargal.*

Pasrt Used:
Dried leaves

Constituents:
Sitosterols,choline, flavonoids, glycosides, namely argelin and argelosid and a triterpenoid saponin.

Folk Medicinal Uses:
For cough, infusion of leaves for gastro-intestinal cramps, stomachic, anticolic, for colds, urinary tract, antisyphilic if used for long period of 40-80 days.

References :

1- El-Fishawy, A.M, 1976. A Pharmacogostical study of *Solenostemma arghel* Hayne growing in Egypt. M.S. Pharm. Thesis, Faculty of Pharmacy, Cairo University. pp.402.
2- Osborn, D.J. 1968. Notes on medicinal and other uses of plants in Egypt. Economic Botany, **22**: 165-177.
3- Mahran, G.H.; M. Saleh and A.M. El-Fishawy. 1977. A phytochemical study of *Soleostemma arghel* Hayne growing in Egypt. J. Agr. Med. Pl. 1(1).

32. **Teucrium polium L.**; Sp.Pl.;ed.1,566 (1753)

Arabic : *Ja'ada* جعدة

English : Mountain germander, Cat thyme, Hulwort.
French : Pouliot de montagne, GermandrÈe en capitule, Polium, Germandr tomenteuse, GermandrÈe polium.
German : Poleigamander, Berggamander
Italian : Polio, Camendrio di montag na, Timo bianco, Polio primo, Teucrio tomentose, Canutola.

Morphological Description

Is a perennial herb having a pleasant aromatic odour and a bitter taste. It flowers from March to April. It has a tap root with many lateral branches, with dark and wrinkled surface. The herb has a cylindrical stem monopodially branced with short internodes.

Both stem and its branches are white in colour. Leaves are opposite decussate, exstipulate, sessile having aromatic odour and bitter taste. Lamina is oblong to linear with curved wings, base symmetric, margin crenate and venation pinnate reticulate. Both surfaces are hairy, the upper one is dark green and the lower one is whitish green, inflorescence is verticillaster (Plates 41 & 42).

Ecology:

The plant grows in rocky habitats and compact fine-textures soils with stones and pebbles.

Distribution:

Local : The Mediterranean zone, the deserts and Sinai.
Regional : All north African countries.
Global : Arabia.

Status:

The plant is overcollected to be used in folk medicine. It is threatened

Part used:

Stem and flowering tops.

Constituents :
Diterpenoids: picropolin, 6-acetyl picropolin, isopicropolin, 19-acetylgnaphalin, teucrins P_1, P_2 and P_3, montanin, teupolins I-V. Iridoids, flavonoids, hedragenin, ursolic acid, α- and β-amyrins, and volatile oil.

Folk Medicinal Uses:
Hot infusion of tender parts of plant taken for stomach and intestinal troubles, plant used in a steam bath for colds and fevers, useful against smallpox and itch, infusion vermifuge, stimulant, depurative, for feminine sterility, colds and tonic, astringent, vulnerary. In Egypt, it is used as appetizer, expectorant and hypoglycaemic.

Pharmacological Actions and Indications:
The aqueous extract possesses a hypoglycaemic effect. Flowers and leaves of the plant possess conduolonic effect. It also stimulates the neuromotor centers for uterine and intestinal musculature. The plant shows antimicrobal activity against *Bacillus subtilis* and *Staphylococcus aureus.*

References:

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33. **Thymus bovei Benth.**; Lab.Gen.Sp. 342 (1834)

Arabic : *Zaatar* زعتر

English : Thyme
French : Herb de thym
German : Thymian

Morphological Description:
Woody aromatic undershrub, up to 30 cm high. Stems much branched. Leaves short-petioled, dotted (reddish) and glabrous on both surfaces, lanceolate to oblong-linear, with acute apex. Flowers purple in 6-flowered verticellaster.

Ecology:
The plant is a chasmophyte growing in rocky habitats, usually in limestone wadis.

Distribution:
Local : Confined to the Isthmic desert (Gebl El Maghara, N. Sinai) and Galala mountains in the north Eastern (Arabian)desert.
Regional : Egypt.
Global : Recorded in Palestine.

Status:
Vulnerble, in view of its limited geographical distribution. Bedouin collect the plant as a spice. Cultivation of the plant in botaical garden is the proper way for its conservation.

Part Used:
The aerial parts of the plant.

Constituents:
The flowering herb of *Thymus bovei* Benth.; yields 1.75% of a pale yellow volatile oil with characteristic aromatic thymol-like odour and pungent taste. Components of the oil comprise hydrocarbons (15.93%), phenols (71.87%), alcohols (2.35%), esters (3.74%), oxides (1.06%), ethers (0.15%), and aldehydes (0.05%). Because of the high thymol content (68.4%) and low carvacrol content (3.47%), the oil is similar to that of *Thymus vulgaris* L. but it differs from the volatile oils of all other *Thymus* species.

Folk Medicinal Uses:
Because of its spasmolytic action, it is an important stomachic and carminative. It is also used as a diuretic, urinary desinfectant and vermifuge.

Biological Activities:
The herb is used internally, because of its essential oil content, as expectorant and bronchospasmolytic, e.g. in acute and chronic bronchitis, whooping cough, and generally in catarrh of the upper respiratory tract. The essential oil of the plant exhibited a remarkable broad spectrum antimicrobial activity due to its high phenolic content,which explains the favorite use of the plant by the natives for treatment of gastrointestinal infections. Externally, thyme is used as a antibacterial and also deodorizing agent in inflammation of the mouth and throat (as a mouth wash and gargle) and as rubifacient in frictions, bath additives and in potpourri.

Economic Potential:
Thymus bovei Benth.; as well as the essential oil obtained thereof, can be recommended to substitute the herb of *Thymus vulgaris* and its essential oil as a flavouring, desinfectant and antiseptic agent in pharmaceutical preparations, food products, soaps and deodorant industries. Therefore, the plant is of growing economic potential and attention has to be directed towards its propagation.

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34. **Thymus capitatus (L.) Link.**; Fl.Port. 1:123 (1809)

Saturejia capitata L.; Sp.Pl.;ed.1, 568 (1753)

Coridothymus capitatus (L.) Rchb,f. Oesterr. bot. Woichenbl. 7:161 (1857)

Arabic : Za'atar زعتر

English : Headed thyme
French : Thym de Crete

Morphological Description:
Densely glandular-dotted dwarf undershrubs. Branches thick, white, somewhat spinescent. Leaves small, opposite, entire, linear, with margins turned uwards. Flowers in terminal heads (Plate 43).

Ecology:
The plant is a chasmphyte growing in the crevices of the rocky ridges.

Distribution:
Local : The western Mediterranean coastal region
Regional : All the north African countries

Status:
The plant is endangered. It is collected by the Bedouin for tea making. The plant is becoming more rare in the last decades after the consruction of the summer resorts. The ridges supporting this species have been quarried for brick making. The habitat of the plant has been eradicated. There is a great need to cultivate the plant.

Folk Medicinal Uses:
In addition to being boiled as refreshing drink, the Bedouins collect this plant to use it in stomach diseases and cough.

There is a third spcies of *Thymus*, namely ***Thymus decussatus*** Benth.; Lab.Gen.Sp.342 (1834).

This species is endemic and occurs only in Southern Sinai.The plant is a chasmophyte growing in rocky areas, especially wet sites. The plant is collected for its aromatic odour due to the oils present in its leaves.It is used as a spice and a flavouring agent to the tea and in the folk medicine.The infusion is used for nausea. It is an endangered plant, which needs conservation.

35. **Tribulus terrestris L.**; Sp.Pl.;ed.1,387 (1753)

Arabic	:	*Hasak*	حسك
		Dars el 'agouz	ضرس العجوز

Berber : Timgelest, Tadjnouft, Tamezlagelt, Amagelost, Tagruft.
English : Caltrops, Land caltrops.
French : Tribule terrestre, Croix de Malte.
German : Echter b¸rzel.
Italian : Tribolo, Basapie, cacciarello, ceciarello.
Turkish : Demir dikeni.

Morphological Description:
Annual or biennial herb up to 20 cm. Stem, prostrate hairy. Leaves opposite, compound paripinnate, grey green, flower white or yellow. Fruit, 6-8 mm in diameter, subglobose. The following 3 varieties of *Tribulus terrestris* are recorded from Egypt: var. *orientalis*, var. *robustus*, and var. *bicornutus*.

Ecology:
The plant grows in sandy loamy soils, especially in depressions receiving runoff water.

Distribution:
Local : In all the phytogeographical regions of the country.
Regional : All the North African countries.
Global : South Europe, tropical and subtropical Asia, North Australia, Africa and tropical parts of the new World.

Part used:
Dried aerial part

Constituents:
The plant contains several sapogenins and flavonoids. Sapogenins: diosgenin, tigogenin, ruscogenin hecogenin, gitogenin, chlorogenin and 25-D-spirosta-3,5-diene. Flavonoids: quercetin, kaempferol, and several glucosides of kaempferol, quercetin and isorhamnetin.

The plant also contains alkaloids (harman, harmol, and harmine; oligosaccharide (tribulosin) and sterols.

Folk Medicinal Uses:

Flower: for leprosy; stem : for scabious skin diseases and psoriasis. Fruit: for congestion, headache, hepatitis, impotence, liver, ophthalmia, stomatitis, vertigo, recommended for kidneys, liver and vision. Seed: as abortifacient, aphrodisiac, astringent, diuretic, tonic, for abscesses, anaemia, coughs, fluxes, heamorrhoids spermatorrhea and stomatitis. Plant is recommended as anticancer. The leaf is eaten as a pot herb in West Africa.

Pharmacological Actions, Indications and Toxicity:

The plant is poisonous to sheep and goats. It produces hepatogenic photosensitivity in livestock. Ether extract of the plant possesses juvenile hormone effect on penultimate instar of *Dysdercus cingulatus* and increased doses result in the increased mortality and development of adults with crumpled wings. The plant possesses anticancer activity . The extract of the plant is antispasmodic. The aqueous extract of the plant lowers experimentally induced hyperoxaluria.

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36. **Urtica pilulifera L.**; Sp.Pl.;ed.1,983(1753).

Arabic : *Qorreis* قريص

Horreiq حريق

English : Roman nettle.
French : Ortie romaine, Ortie, Ortie rude, Ozomaine.
Berber : Imereksin, Imezri, Timezrit, Mezri, Tezzount.
German : Pillen Nessel.
Italian : Ortica romana.
Turkish : Isirgam otu.

Morphological Description:
Annual tall herb with large, opposite, broad leaves. Leaves serrate, beset with stinging hairs. Flowers monoecious, small green. Male flowers spiked, female flowers in globose heads, about 1 cm in diametre, hanging on a 2-3 cm long peduncle (Fig. 16).

Ecology:
The plant is a common weed in the cultivated land.

Distribution:
Local : The Mediterranean region and the Nile Delta.
Regional : All North African countries.
Global : Widespread in various countries.

Status:
The plant is a fairly common weed.

Part Used:
The herb and the seeds.

Folk Medicinal Uses:
It is used for curing sore joints by mixing the plant juice with oil. The contents of the stinging hair provide a cure for rheumatism, hemorrhage. Decoction of the summits of the plant is diuretic, depurative. Seeds are used for renal stones and inflammtion of the bladder, diuretic and aphrodisiac.The seeds known as *Bizr Anjora* have been known by the Moslem Scholars as aphrodisiac.

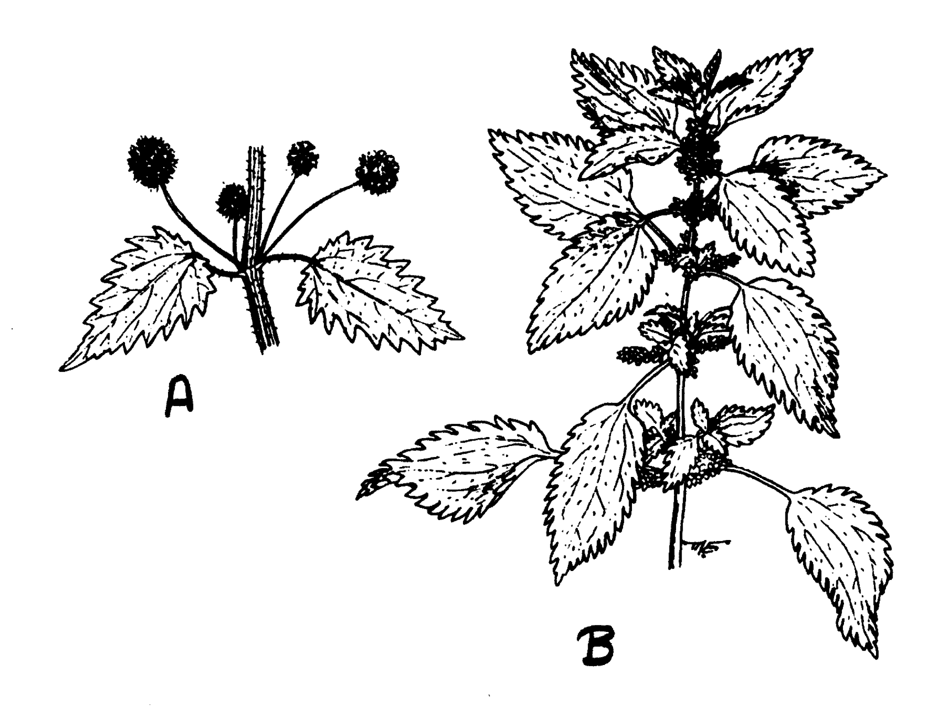


Fig. 16- A- ***Urtica pilulifera*** **L. B-** ***Urtica urens*** **L.**
(After: Täckholm, 1974, Students' Flora of Egypt).

37. **Urtica urens L.**; Sp.Pl.;ed.1 984 (1753)

Arabic : *Horreiq* حريق

Qorreis قريص

Sha' ar El-agouz شعر العجوز

English : Small nettle, Dwarf stinger.
French : Petite ortie, Ortie Br°lante, Ortie grieche.
Berber : Timezrit, Harrous, Iherriqet.
German : Kleine Nessel.
Italian : Piccola ortica, Ortica ardente, Ortica pungente.

Morphological Descriptin:
Annual small herbs branching from the base. Leaves opposite, beset with stinging hairs, acutely incised-dentate. Flowers are monocious, small, green. Mae flowers simple, usually shorter than the petiole, less numerous than the feale ones (Fig. 16, Plate 43).

Ecology:
The plant is a very common weed in the cultivated land.

Distribution:
Local : The Mediterranean region, The nile region, some desert areas where cultivation occurs.
Regional : All North African countries.
Global : Almost a cosmopolitan plant.

Status:
The plant is a very common weed.

Part used :
Aerial parts and leaves, seeds are used also.

Constituents :
Leaves contains formic acid.

Folk Medicinal Uses:

The plant is used to treat rheumatism. It is aphrodisiac, useful for heamorrhage, kidney ailments. It is also diuretic, in eczema, dysmenorrhoea, Externally, it soothes wounds and ulcers. The entire plant especially on contact with its stinging hairs causes skin irritation, several rashes with itching (urticaria).

38. **Ziziphyus spina-christi (L.)** Desf.; Fl.Atlant. 1:201 (1798)

Rhamnus spina-christi L.; sp.Pl.;ed.1, 195 (1753)

Arabic : *Sidr* سدر

Fruit : *Nabq* نبق

Berber : Abaqua, Korna.
English : Christ's Thorn , Nabq Tree, Syrian Christ Thorn .
French : Nabca, Epine du Christ, Faux jujubier.
German : Christ Dornbrustbeere, Christdorn.
Italian : Spina di Cristo, Giuggiolodi di Palaestina.
Turkish : Nabk ag , Sinȧan dikeni, Kunar.

Morphological Description:
It is a tree which reaches up to 8 metres high. Leaves alternate, oval, finely-toothed, with a straight or slightly hooked spiny stipules. Flowers very small, greenish yellow, in clusters. Flowering from September to December. Fruit yellowish brown, edible one-seeded drupe (Plate 44).

Par used:
The leaves, fruits and bark and other parts.

Constituents:
Stigmasterol, ß-sitosterol, ß-sitosterol-ß-D-glucoside, octacosanol, octacosanyl behenate, nonacosane, Betulenic, ceanotic acids and urosolic acid, ceryl alcohol, christione A, E, and F, mauritine, C, franganine, stevanine A, flavonoids : dihydrokaempferol, taxifolin, taxifolin-5-O- glucoside, apigenin-7-O-glucoside.

Folk Medicinal Uses:
Leaves decoction for colds and hypertension. Infusion of the leaves is used as astringent anthelminthic, antidiarrhoric, demulcent, depurative, anodyne, pectoral, stomachic, tonic, for tooth aches, tumors. In Saudi Arabia, they are used in flok medicine to heal wounds skin diseases, and inflammatory conditions. They are applied locally for treatment of sores, skin diseases against ring worms, fever, sex diseases and ulcers. An infusion prepared from the fruits is used as febrifuge, emollient, laxative. It is a reputed remedy for measles, bronchitis, cough, and tuberculosis. Powdered seeds are mixed with lemon juice for liver complaints and anxiety. An infusion is prepared from the flowers for eye wash and a febrifuge. A decoction of the bark is used for vinereal diseases. The root

juice is used for arthritis and rheumatism. Wood ash is mixed with vinegar and used locally for serpent bites.

The *Attarin* shops in the Arab Gulf countries sell the powdered leaves of the plant. The women use the paste of this powder in water as shampoo. The infusion of the leaves has been used as cleanser.

Pharmacological Actions and Indications:

The saponin fraction of the leaves has an antimicrobial. activity against *Candida albicans*. It also exhibited improvement of glucose utilization in diabetic rats.

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39. **Zygophyllum coccineum L.**; Sp.Pl.;ed.1,386 (1753)

Arabic :		
	Rutreyt	رطريط
	Kammun kermany	كمون كرمانى
	Ghassoul	غاسول
	Balbal	بلبال
	Tartir	طرطير
	Bowal	بوال

Morphological Description :
A desert succulent undershrub, up to 75 cm high. Leaflets 2, over 10 mm long, cylindrical, bright green, fleshy carried on a fleshy long petiole.Flowers white. Capsule 5-valved, 8-10 mm long, with obtuse apex (Plate 44).

The leaflets and sometimes the petioles are shed under severe dry conditions to reduce the transpiring surface. Th fleshy cortex of the stem is shed under these conditions for the same reason.

Ecology :
The plant is very common in the limestone wadis of the eastern (Arabian) desert. It dominates a community of widespread occurrence there.

Distribution :
Local : Arid zones of Egypt (Eastern and Western Desert and Sinai Peninsula).
Regional : Syria, Palestine and Sudan.

Status :
The plant is common. Being unpalatable, it is not grazed by animals. It does not give good fuel. So, the plant is neither grazed nor cut for fuel.

Part Used :
Fruits and seeds.

Constituents :
Zygophyllin (28% in leaves, 0.18% in stems and 0.26% in fruits). Quinovic acid (0.36% in leaves, 0.31% in fruits and 0.47% in stems). Flavonoids e.g.; kaempferol-3-rutinoside.

Folk Medicinal Uses:

In the form of infusion as a remedy for rheumatism, gout, cough, asthma, hypertension, flatulent colic and as diuretic.

The juice expressed from the fresh leaves and stems are used as abrasive cleanser and as a remedy for the treatment of certain skin diseases.

Biological Activities:

1- Anthelmintic.
2- Stimulation of toads heart.
3- Stimulation of guinea pig`s intestine.
4- Zygophyllin and quinovic acid exhibited anti-inflammatory activity, cortisone-like action, choleretic and antipyretic activities.
5- The aqueous extract produced lowering in blood pressure, diuretic, antipyretic, local anaesthetic and antihistaminic activities.

Economic Potential:

The plant has good reputation in folk medicine. Its marketing depends on collection from the wild.

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Chapter Four

PLANTS OF POTENTIAL MEDICINAL VALUE

In the last two chapters, we discussed the pharmacopoeial plants and those commonly sold in the market and used in the folk medicine. However, there is a third group of plants, which are of potential value as medicinal plants. Some of these plants are used in areas where they grow, but are not of widespread use in other localities. Others have been investigated from the pharmacognostical, phytochemical and/or pharmacological point of view. The results are not enough to evaluate the plant as a pharmacopoeial item. The list of these plants could be very long. Nevertheless, we shall give some of the important wild plants of this group with short notes on each. The available ethnopharmcological information about these plants seem to be insufficient. Those given here are compiled from the available literature (cf. Al-Rawi and Chakravarty 1964 and Boulos 1983, Batanouny 1994 and others). There is a great need for field surveys among the natives to report correctly about these plants and their indigenous uses. Also, it is necessary to compile the available information and prepare an annotated bibliography to help the researchers in the different fields related to the medicinal plants. The traditional knowledge about the use of these plants should be recorded. There is fear from the loss of the biodiversity; the medicinal plants represent an important component of it, and consequently the loss of the traditional knowledge of the healers. Conservation, either ex situ or in situ, is indispensable It is to be noted that the present treatise aims at gathering information and data about the wild medicinal plats of Egypt. We can not pretend that it covers all the various aspects of the subject. However, it is a trial towards recording some of the available data and information to represent a bases for future studies. In the coming pages, we shall give a short list of some plants, which would have considerable value as medicinal plants.

A list of another group of plant species is given at the end. These species were studied from the pharmacognostical point of view. They can be promising medicinal plants. Doubtless, one expects more and more species to be added to the list of wild medicinal plants in Egypt.

Acacia raddiana *Savi Talh, Seyal* طلح – سيال

(= *Acacia tortilis* (Forssk.) Hayne, subsp. *raddiana* (Savi) Brenan)

A tall spiny desert tree, with round irregular crown and reddish bark. The flowers are arranged in heads. The legume is flattened and spirally twisted. The fruit and the young branches are good fodder for the camels, sheep and goats. Gum from the tree is dispensed in water and used to treat occular affections, jaundice, and pulmonary diseases. Dried powdered bark disinfectant, and it is used for healing wounds. Seeds, entire or powdered, are taken as antidiarrhoeic.

Achillea santolina *L.*

Aromatic hairy perennial which grows in the barley fields in the Mediterranean coastal zone and the Isthmic desert. The plant flowers in spring. It is used locally to reduce the pain of toothache by rubbing the young flowering branches against the teeth or by chewing them. The plant is becoming rare these days due to the impact of human activities on its habitat.

Ajuga iva (L.) Schreb.

(= *Teucrium iva* L.)

Small woolly, aromatic perennial herb which grows in rocky habitats in the western Mediterranean region. The cold infusion of this herb is considered antihelminthic. It is said that the hot infusion is useful in the case of diabetes. The plant is endangered.

Alhagi graecorum Boiss. Alhag- Aqoul الحاج – العاقول

(= *Alhagi mannifera* Jaub. & Spach)

Perennial, leguminous spiny undershrub. It is common in all the phytogeographical regions of the country. It grows in waste places, saline habitats. The plant is a favourable food for camels, sometimes called shouk el-gamal; Camel thorn. The Latin name is given after the Arabic name *alhag*. The plant is used as a laxative as well as in diseases of the urinary tracts.

Asphodelus tenuifolius Cav. Barwaq بروق

(= *Asphodelus fistulosus* L. var. *tenuifolius* (Cav.) Baker)

A small annual herb with a rosette of semi-terete leaves. Flowers in a lax panicle. Seeds are black. It grows in all the phytogeographical regions of Egypt. The seeds are diuretic. They are eaten with yoghort.

Bacopa monnieri (L.) Pennell.

(= *Lysimachia monnieri* L.)

Creeping glabrous perennial herb, growing in mats. Leaves opposite, entire, rounded at tip. It grows in wet places in the Nile region, Oases. It is a rare plant

and subject to threats due to drying the wet habitats supporting the plant. It is used as a tonic, and in epilepsy, hysteria, insanity.

Blephasris ciliaris (L.) B.L.Brutt *Shouk ed-dhab, Kohl El Ajouz* شوك الضب – كحل العجوز
(= *Ruellia coiliaris* L.; *Blepharis edulis* (Forssk.(Pers.; *Blepharis persica* (Burm.f.) Kuntze)
Thistle-like spiny perennial herb. Leaves and bracts rigid of silvery appearance, 4-rowed, patent, recurved, spiny-tipped and prickly-toothed. Flowers blue in a dense bracteate spike. The plant grows rarely in Sinai, Gebel Elba and the Red Sea region. The charcoal from roots ground into a powder as "kohl" (eye powder) for feeble sight, probably against cataract.

Capsella bursa-pastoris (L.) Medic. *Kees el Ra'ee* كيس الراعى
(= *Thalspi bursa-pastoris* L.)
Annual winter weed growing in cultivated land in the Delta. It is a small herb. The flowers are used to control haemorrhage, while the herb is used as an astringent, diuretic and antiscorbutic.

Centaurea alexandrina Del.
Biennial herb with large heads. Involucral-scales are purple, often spreadingly recurved. Flowers dirty yellow with purple-brown anthers, pappus absent. It is common in the Mediterranean region, usually growing along roads and in waste places. The extracts from the flowering branches are antibacterial and antidiabetic.

Centaurea calcitrapa L. *Morreir* مرير
Tall richly branched biennial weed. Heads are small with conspicuous, yellow involucral-spines. Flowers white or crimson, pappus absent. The plant grows along roads and ca nal banks, specially in the Nile region. It grows also in the Mediterranean region and the Oases. The plant is bitter. Perhaps it has the Arabic name morreir, (bitter) from its taste. The herb is bitter-astringent, appetizer, vulnerary, antiophthalmic, antifebrile, stomachic, for intermittent fever, eye diseases. Leaves are used for cephalalgia. Flowering summits febrifuge. Root and fruit are diuretic. Seeds vulnerarey, febrifuge, for renal stones and pains.

Chenopodium ambroioides L. *Netanah* نتنه
A yellow-green annual herb with rich inflorescence. It is characterised by its foetid odour. It is a common weed along canals in the Nile, Mediterranean regions and the Oases. Infusion of leaves digestive, carminative, stimulant, stomachic, antiasthmatic. Leaves and young shoots and fruiting summits stomachic, diuretic, anthelmintic, antispasmodic, vermifuge and emmenagogue.

Chrozophora tinctoria (L.) Raf.
(= *Croton tinctorius* L.; *Chrozophora obliqua* (Vahl) A.Juss. ex Spreng.; *Chrozophora verbascifolia* (Willd) A.Juss. ex Spreng.; *Chrozophora hierosolymitana* Spreng.)
An annual herb covered with stellate indumentum. Leaves thick woolly, ovate-lanceolate. It grows in field margins and waste places, mainly in the Nile region. The plant is cathartic and emetic.

Cotoneaster orbicularis Schltdl.
An unarmed shrub. Leaves small, entire, woolly beneath. The fruit is a very small ovoid red pome. The plant is endangered. It is very rare in Sinai mountains. The infusion in water is used in typhoid, and antispasmodic.

Cotula cinerea Del.
A small grey-woolly erect or ascending annual herb with yellow discoid heads of hemispherical shape. Leaves more or less fine-dissected with flat entire lobes. It is common in sandy habitats in the desert, Mediterranean region, Red Sea region and Sinai. Infusion of flower heads is aromatic and very agreeable. It is stomachic and used to flavour tea replacing peppermint, useful for broncho-pulmonary conditions, against scorpion bites, rheumatism, vomiting, nausea and stomach pains.

Cuscuta planiflora Ten. Kashout -Hamoul كشوت – حامول
Annual twining stem parasite, richly branched, yellowish or crimson. It grows on a wide variety of hosts. It is widespread in all the phytogeographical regions of the country. Some species of the Genus Cuscuta are known as kashout in Arabic, which can be derived from the Greek name Cuscuta. The cold infusion is usually used as an intestinal disinfectant. The stems are used for obesity. The infusion of seeds is used in catarrh.

Cynomorium coccineum L. *Tarthouth* طرثوث
Perennial leafless fleshy parasite, devoid of chlorophyll. It is a parasite on halophytes growing in saline habitats in the Mediterranean region. The plant is usually grilled by the Bedouin, who think the plant has aphrodisiac properties. Dried plants are powdered and mixed with butter and used against biliary obstruction. The powder is added to meat dishes as a condiment.

Echium angustifolium Mill. subsp., ***serecium*** (Vahl) Klotz)
(= *Echium serecium* Vahl; *Echium distachum* Viv.)
A tall biennial plant. Flowers small, flesh-coloured, in a richly branched, yellow-hairy inflorescence. Lower leaves broadly lanceolate, large, upper ones narrower. The plant is very rare and confined to the western Mediterranean coastal zone.

The herb is a popular remedy for snake bite. It is interesting to mention that the herb is eaten by donkeys.

Eminium spiculatum (Blume) Schott *Louf* لوف
(= *Arum spiculatum* Blume; *Arum crassipes* Boiss.; *Helicophyllum crassipes* (Boiss.) Schott)
Stout cormous perennial herb with pedately dissected leaves, appearing together with the flowers. Spathe is very large, up to 15 cm long, with an open, inside purple-mottled tube, ending in an inside blackish-purple warty limb. The plant is fairly common in the Mediterranean coastal region. However, it is subjected to threats due to changes in its habitat. It is considered by the Bedouins a dangerous poisonous plant The juice is hypotensive, the alcoholic extract is hypertensive, while the aqueous extract is devoid of toxicity. Purified alcoholic extract of corms contains glycosides.

Ephedra alata Decne Alanda علنده
& ***Ephedra aphylla Forssk.*** (= E.alte C.A.Mey.)
Highly ramified perennials with scaly leaves. Fruits and young shoots are used in local medicine as an astringent. It is used also in the treatment of asthma, and as a cardiac stimulant. Relatives of this species (E. sinica) contain ephedrine.

Eryngium creticum Lam. & E. campestre L.
Thistle-like spiny perennial plant, with thin divericate , often blue branches. Basal leaves thin, with flat petioles, soon wilting. The plant is rare in the western Mediterranean region. The leaves and roots are used against anaemia, dropsy, eolic and prolongate perturbation period.

Euphorbia helioscopia L.
Annual herb branching from near the base. Leaves alternate, spathulate, serrulate. Umber rays 4-5, 2-4 cm long, once -twice divided. Seeds 1.5-2 mm, regularly alveolate. It is common in the Nile and the Mediterranean regions. It grows as a weed. The root is used as anthelmintic, purgative, toxic, vesicatory. The seeds are used in cholera. The latex is highly irritating to mucous membrane and toxic to mammals and fish. Leaves are used as vermifuge, and in fever.

Gnaphalium luteo-album L.
(= *Pseudognaphalium luteo-album* (L.) Hilliard & b.L.Burtt.)
Annual woolly plant with simple entire, sessile leaves and small clustered heads. The stem is leafless upwards. Heads corymbose. It is very common as a weed especially along canals, ditches, on muddy soil. It occurs in the Nile and Mediterranean regions. The leaves are astringent and vulnerary. The plant is

used as a counter irritant for gout.

Haplophyllum tuberculatum (Forssk.) A. Juss. شجرة ريح – شجارة
Shajarat Reeh, Shjarah
(= *Ruta tuberculata* Forssk.; *Haplophyllum longifolium* Boiss.; *Haplophyllum obovatum* (Hochst. Ex Boiss.) Hand.-Mazz.)
Perennial, densely glandular-tuberceled, 30-50 cm high herb of unpleasant smell. Leaves much variable in shape, from narrowly linear to short, obovate. Flowers yellow and variable in size. The plant is recorded in almost all the phytgeographical regions of Egypt. It grows in fine sandy soils. The plant is collected and sold in the shops in the west Mediterranean coastal region under the name "shajarah" . In north Sinai , it known as dharret rieh, or um-jeneinah. The Arabic saying in El Arish area "*Um Jeneinah, riehetha Helwa Wa Sheina*"denotes that the odour of this plant is both sweet and bad. When the fresh plant is smelled slightly it has a sweet odour, but when squeezed and smelled it has a bad odour. Flowering and fruiting branches febrifuge, local antipoison, for vomiting, nausea, constipation, malaria, difficult childbirth, anemia, rheumatism, gastric pains, intestinal worms, eye and ear troubles, aphrodisiac; decoction for rheumatic pains.

Herniaria cinerea DC. *Umm Waja'a El Kabid* أم وجع الكبد
(= *Herniaria virescens* DC; *Herniaria diandra Bunge*; *Hirniaria hirsuta* subsp. *cinerea* (DC) Cout.)
Annual with slender root. Branched from the base in one plane with branches almost at right angle to the main stem. Leaves alternate, acute, hairy on both surfaces. A variety (var. cinerea Herm.) occurs also. The plant is common mainly in the Mediterranean coastal region. The decoction of the herb is used in sour throat, as diuretic, powerful narcotic and stomach irritant. The toxic principle can be coumarin.

There are other Herniaria species in Egypt, including: Herniaria hirsuta L.; H.cyrenaica F.Herm.; H. glabra L.; H. hemistemon J. Gray; and H. fontanesii J. Gay. These species deserves phytochemical sand pharmacological studies.

Hyoscyamus albus L. *Sakaran* سكران
Richly branched stout villous-viscid perennial plant. Most of the leaves rounded-cordate, deeply incised-toothed. It is rare in the western Mediterranean region and in the north Arabian desert. The leaves are used as anodyne, narcotic, sedative in nervous affections. It is often used as a substitute of H. muticus.

Hypericum triquetrifolium *Turra*
(= *Hypericum crispum* L.)
Perennial herb with stiff patent decussate branches, and hence the plant has a

more or less pyramidal aspect. Flowers 1-5 together in the summit of leafy branches and appear in summer. The plant is very are in the eastern Mediterranean region. There is another endemic species of this genus, H. sinaicum Hochst. The latter species is 10-30 cm high, altogether slightly pubescent. Flowers few in a terminal corymbose panicle. It is very rare in the mountains of Sinai. The plant is toxic to livestock.

There is an endemic species, Hypericum sinaicum Boiss. The plant is a perennial growing in Sinai. It deserves study and conservation.

Hyphaene thebaica* (L.) *Mart. *Doom* الدوم
(= *Corypha thebaica* L.; *Cucifera thebaica* Del.; *Hyphaene sinaitica* Furtado)
Dioecious palm. Trunk up to 20 m high , repeatedly bi-forked. Leaves fan-shaped. The plant grows in the oases, in southern Egypt and the Red Sea region. The fruits are edible. Molasses are prepared from the pulpy part. Also, a delicious soft drink is prepared from this pulp. The different parts of the plant have different uses.

Jatropha glauca Vahl
(= *Croton lobatum* Forssk.; *Jatropha lobata* (Forssk.) Muell.)
Erect low undershrub, about 30 cm high, Leaves palmate-lobed, long petioled, blue-green, at base with laciniate hair-like gland-tipped stipules. Female flowers larger than the male. Capsule light yellow, 1 cm long. The plant is very rare and occurs only in Gebel Elba. It is a potential medicinal plant and needs conservation.

Jussiaea repens L.
(= *Ludwigia stolonifera* (Guill. & Perr.) Raven; *Jussaea stolonifera* Guill. & Perr.)
Creeping or floating glabrous aquatic perennial plant. It roots at nodes. When floating, the plant produces clusters of white to pink fusiform roots of very peculiar aspect. Leaves petioled, lanceolate to oblong-ovate. It is rare in the Nile region and grows in and along channels. The herb is used as a plaster or poultice for ulcers and in skin complaints.

***Lactuca serriola* L.** *Khass ez-zeit* خس الزيت
(= *Lactuca scariola* L.)
Annual or biennial herb, with broad, pinnatifid leaves, which are spiny beneath on the midrib. Inflorescence richly branched, spreading. Flowers lemon-yellow, outside dirty red. The plant is a common weed, especially in the Nile region. The herb is used as a diuretic, antispasmodic, sedative and emollient.

***Melilotus indicus* (L.)** All. *Handaqouq* حندقوق
(= *Trifolium indicum* L.; *Melilotus parviflorus* Desf.; *Melilotus bonplandii* Ten.;

Melilotis tommasinii Jord.)
Annual weeds with small yellow flowers and globose legumes. The plant is a common weed in almost all the phytogeographical regions of the country. Infusion of flowering branches is emollient and antispasmodic. Seeds for diseases of genital organs of both sexes.

***Mentha longifolia* L.** *Habaq El Maya* حبق الماء
(= *Mentha spicata* L. var. *longifolia* L.; *Mentha sylvestris* L.; *Mentha lavadulacea* Willd.)
A perennial herb, with linear-lanceolate, almost entire leaves. Flowers minute in a very narrow acuminate spike. It is very rare and occurs only in the mountains of Sinai in moist habitats. Infusion of the herb is carminative, antiseptic, and stimulant. The plant is endangered due to overcollection.

***Mentha pulegium* L.** *Folaiyah* فلية
A perennial herb with small, short-petioled , ovate oblong leaves. Flowers in dense globose whorls. It is a rare species growing in moist habitats in the Nile Delta and the Oases. The plant is endangered. Infusion of the leaves is antispasmodic, antiseptic, chologogue, and bechic.

***Nitraria retusa* (Forssk.) Ascher.** *Gharqad* غرقد
(= *Peganum retusum* Forssk.; *Nitraria tridentata* Desf.)
Thorny shrub with small fleshy leaves. The plant grows in saline habitats forming huge phytogenic mounds. The fruits are edible. It is said that they are useful in the treatment of urinary tracts.

***Paronychia argentea* Lam. & *P. arabica* (L.) DC. Besat El Ard** بساط الأرض
Small prostrate annual or perennial plant with entirely silvery-scarious bracts and stipules. It is rare in the Mediterranean region, Isthmic desert and Gebel Elba.. Infusion of the above-ground parts is diuretic, febrifuge, appetizer, mild aphrodisiac. It may be used for urinary stones. The plant has been reported to be sold by the herbalists in Amman, Jordan. A similar species is *P. arabica* (L.) DC., which is considered as an aphrodisiac and a stimulant

There are different Paronychia species and subspecies growing in Egypt, e.g. *P. sinaica* Fresen., *P. capitata* (L.) Lam. These species can a good material for pharmacological investigation.

***Pulicaria incisa* (Lam.) DC.** *Shai El Gabal* شاى الجبل
A much-branched, woolly procumbent annual or short-lived perennial herb. Ray flowers long and yellow. The plant has an aromatic scent. It is added to the tea to give it a good refreshing flavour. It is carminative and stimulant. It is called in

Arabic "shai gabali" means the tea of the mountain.

There are many Pulicaria species and subspecies in Egypt. These need investigation.

Retama raetam (Forssk.) Webb* & *Berthel subsp. ***raetam*** *Ratam* رتم
(= *Genista raetam* Forskk.; *Retama duriaei* (Spach) Webb; *Lygos raetam* (Forssk.) Heywood)
A leafless desert shrub with long virgate whip-like branches. Flowers white. Fruit one seeded, seeds brown to black. The plant is common in the deserts of the country as well as Sinai and the Mediterranean coastal zone. The plant is used for making eye wash for eye troubles. Root are used against diarrhoea. Branches are used as febrifuge, for treatment of wounds; powdered branches mixed with honey are emetic, given as a purgative and vermifuge, abortive in large doses.

Rhus tripartita (Ucria) Grande *Leqq* لك
(= *Rhamnus tripartitus* Ucria; *Rhus oxyacanthoides* Dum.Cours.; *Rhus ziziphina* Tineo)
Shrub, up to 2 m high, branches short and spiny, reddish brown, glossy. Leaves 3-foliate, with dentate margins. The plant grows on the rocks in the coastal zone, north Arabian desert, Gebel Elba, Sinai and the Red Sea region. The plant is rare and endangered. The fruit is edible. The infusion of the fruits and the leaves is recommended for gastric and intestinal ailments.

Senecio vulgaris L. *Eshbet Salima* عشبة سالمة
Annual herbs with corymbose, yellow flower heads. Leaves deeply cleft with narrow lobes. Heads small, cylindrical, ray florets absent. The plant is a weed in the Nile region and the western Mediterranean zone. It has been noted by the senior author that the weed was common in the sixties in Giza Governorate.

After the establishment of the High Dam, one can note a retreat of the plant to the south. In the eighties, the plant can be collected in Beni Suef to the south. It seems that there is a relation between the occurrence of this species and some minerals in the Nile water deposited in the Valley and the Delta before the construction of the High Dam. The lack of these minerals or elements would cause the disappearance of this species. Flowering branches emenagogue, vaso-constrictor, vermifuge, emollient, hemostatic, mild laxative, and resolvent.

Sonchus oleraceus L. *Go'deid* جعضيض
(= *Sonchus ciliatus* Lam.; *Sonchus glaber* Gilib.; *Sonchus lacerus* Willd.)
Annual herb growing as a weed in the cultivated land. It has a wide ecological amplitude. The plant has been recorded in almost all the phytgeographical regions of the country. The brownish gum left after the evaporation of the juice

of this plant is said to be a powerful hydragogue and cathartic. It has also been used as a so-called cure for the opium habit. Recently, the plant has been found to contain an alkaloid.

Vaccaria hispanica (Mill.) Rauschert, subsp. *hispanica Sabounya* صابونية
(= *Saponaria hispanica* Mill.,: *Vaccaria pyramidata* Medik.; *Saponaria vaccaria* L.; *Vaccaria parviflora* Moench; *Vaccaria segetalis* (Neck.) Garcke)
Annual glabrous herb with dichotomously branched stem. Leaves lanceolate, with sessile cordate base. Flowers long peduncled, rose-coloured. The plant is a common weed in the Nile, Mediterranean regions, Sinai, the Oases and the Isthmic desert. Root vulnerary for abscesses, furuncles, ulcers, scabies, mastitis, lymphangitis, emmenagogue and galactogogue, contraindicated in pregnancy. Decoction of root used to take care of wounds, sores, scabies and different dermal infections, taking into consideration its toxicity. Leaves and roots contain saponins which provoke, in strong diseases, a general paralysis of muscles.

***Verbascum sinuatum* L.** *Muslih Al Anzar* مصلح الأنظار
Woolly biennial plants with flowers umbelled in clusters. The plant is rare in the Nile region, eastern Mediterranean region, Oases and Sinai. The plant is endangered. The roots and leaves are used for the treatment of eye diseases. They have the reputation of ameliorating the sight. They are used for inflammation and as an antipoison. The dried powdered plant is used for all eye diseases.

There are many other Verbascum spp. growing in Egypt. These include: V.fruiculosum Post; V. letourneuxii Asch. & Schweinf.; V. schimperianum Boiss.; V. sinaiticun Benth.; V. schimperianum Boiss.; V. sinaiticun Benth.; V.emobium Murb. and V. decaisneanum Kuntze. The majority of these species occur only in Sinai.

Withania somnifera (L.) Dun. *Somm El Ferakh* سم الفراخ
Shrub with broad entire, asymmetric leaves The fruit is bright red berry, enclosed by the inflated calyx found in clusters on the stem. The plant grows in different phytogeographical regions in Egypt. It grows mainly along the cultivated fields, especially in the Delta and Nile Valley. It is narcotic, and anti-epileptic. The seeds and fruits are diuretic. The leaves are used for tumers and tuberculated glands. The tuber is used in inflammatory conditions, psoriasis, bronchitis, ulcers, scabies.

Xanthium brasilicum Vellozo *Shubbeit* شبيط
An annual herb with simple or few- branched stem. Leaves are broadly ovate to cordate, irregularly incised-crenate. Fruit hairy, with thick stout terminal peaks. It is a common summer weed in cultivated land. The fruits are cooling and are used in the treatment of smallpox. The root is bitter, tonic, and believed to be

useful in cancer and strumous diseases. The involucre is used in hemicrania. The plant has diaphoretic and sedative properties.

The other Xanthium species; X. strumarium L. (= X. brasilicum Velloso) with its two subspecies (Subsp. strumarium and italicum) deserve future pharmacological investigations.

The above mentioned species are examples of numerous ones which have been investigated. However, there is an inexhaustible list of plants, which need further investigations. A list of some of these species is given below.

Amaranthus tricolor L.
Arthrocnemum macrostachyum (Moric.) Moris (=*Arthrocnemum glaucum* n (Del.) Ung.-Sternb.)
Bidens pilosa L.
Brassica tournefortii Gouan
Carduus getulus Pomel
Centaurea aegyptiaca L.
Centaurea glomerata Vahl
Centaurea pallescens Del.
Crotalaria aegyptiaca Benth.
Cynanchum acutum L. (= C. monspeliacum L.)
Deverra tortuosa (Desf.) DC. (= *Bubon tortuosum* Desf.; *Pithuranthos tortuosus* (desf.) Benth.)
Echiochilon fruticosum Desf. (= *Lithospermum divaricatum* Spreng.)
Fagonia arabica L. Different varieties
Fagonia bruguieri DC.
Ferula sinaica Boiss.
Haloxylon salicornicum (Moq.) Bunge ex Boiss. (= *Caroxylon salicornicum* Moq.; *Haloxylon schweinfurthii* Asch.; *Hammada salicornica* (Moq.) Iljin; *Hammada elegans* (Bunge) Botsch.)
Heliotropium digynum (Forssk.) C.Chr.(= *Lithospermum digynum* Forssk.); *Heliotropium luteum* Poir.)
Launaea spinosa (Forssk.) Sch.Bip. ex Kuntze (= *Prenanthes spinosa* Forssk.; *Zollikopheria spinosa* (Forssk.) Boiss.)
Mesmbryanthemum crystallinum L.
Moltkiopsis ciliata (Forssk.) Johnst. (= *Lithospermum ciliatum* Forssk.; *Lithospermum angustifolium* Forssk.; *Lithospermum callosum* Vahl.; *Moltkia ciliata* (Forssk.) Maire)
Muscari comosum (L.) Mill.(= *Hyacinthus comosus* L.; *Bellevalia pinardii* Boiss.; *Leopoldia camosa* (L.) Parl.; *Leopoldia holzmanni* (Heldr.) Heldr.; *Muscari pinardii* (Boiss.) Boiss.)

Nauplius graveolens (Forssk.) Wiklund (= *Buphtalmum graveolens* Forssk.; *Asteriscus graveolens* (Forssk.) Less.; *Odontospermum graveolens* (Forssk.) Sch.Bip.

Nicotiana glauca Graham

Onopordon alexandrinum Boiss.

Pancratium maritimum L.

Pancratium sickenberhgeri Ascher. & Schweinf.

Pergularia tomentosa L. (= *Daemia cordata* (Forssk.) R.Br.; *Daemia tomentosa* (L.) Pomel)

Phlomis aurea Decne

Salvia aegyptiaca L. (= *Salvia pumila* Benth.)

Senecio spp.

Silene succulenta Forssk.

Thymelaea hirsuta (L.) Endl. (= *Passerina hirsuta* L.)

Trichodesma ehrenbergeri Schweinf. (= *Borago arabica* Boiss.; *Trichodesma africanum* (L.) R.Br. var. *ehrenbergii* (Schweinf.) Post)

Urospermum picroides (L.) F.W. Schmidt (= *Tragopogon picroides* L.)

Plate 33



Cymbopogon schoenanthus in the *attar* shop, Aswan



Dry ***Cymbopogon schoenanthus*** (*halfa barr*)

Plate 34



Dry rhizomes of ***Cyperus rotundus*** in the *attar* shop, Cairo

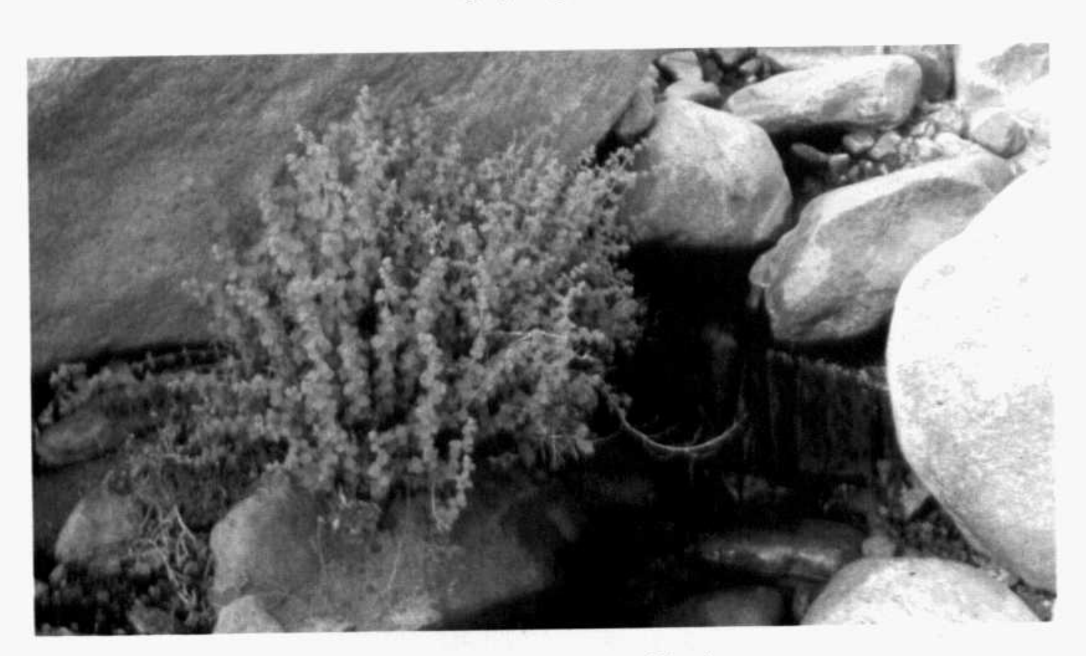


Dry twigs of ***Juniperus phoenicea*** (*Ara'r*) in the *attar* shop, Cairo

Plate 35



Seeds of ***Moringa peregrina*** *(Habba ghalia)*

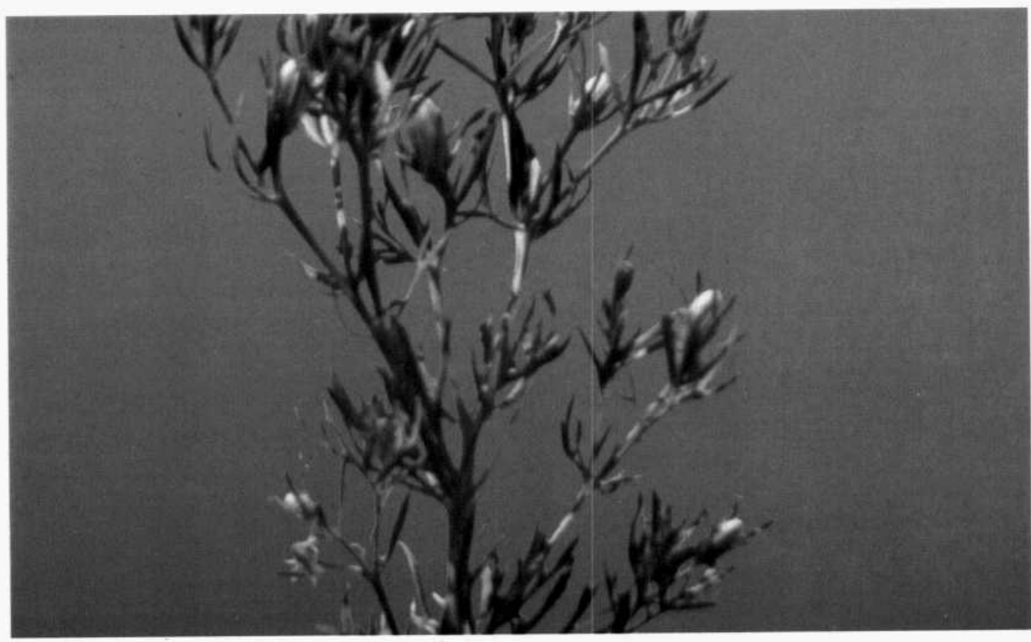


Origanum syriacum, Sinai

Plate 36



Peganum harmala (*harmal*)

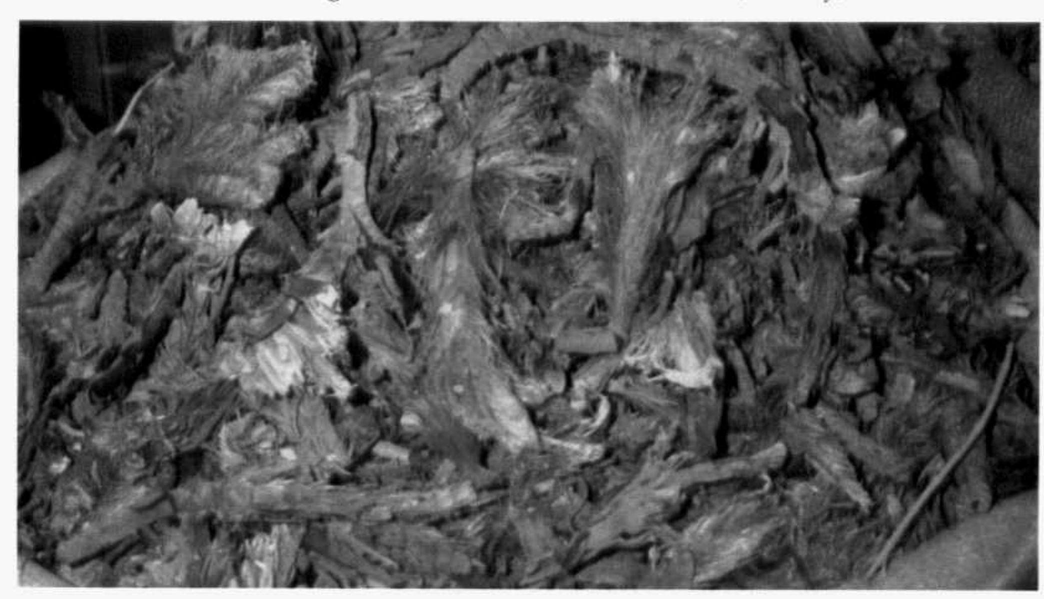


Flowering branch of ***Peganum harmala***

Plate 37



Flowering branch of ***Pluchea dioscorides*** (*Barnouf*)

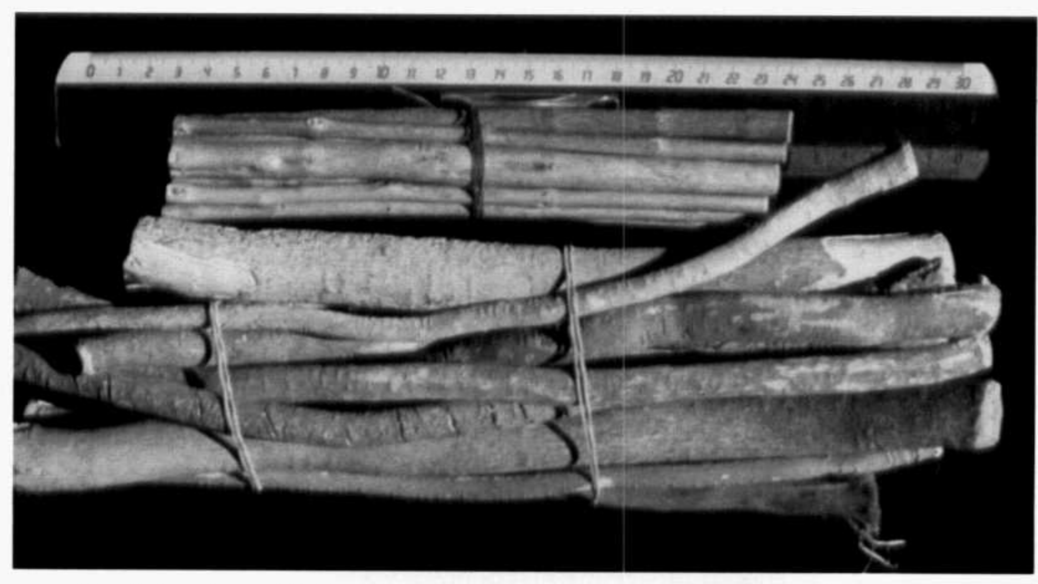


Posidonia oceanica in the *attar* shop, Cairo

<u>**Plate 38**</u>



Flowering ***Rumex vesicarius***, Sinai



Toothbrushes of ***Salvadora persica***: underground stolons, long pieces; stems, short pieces and greenish

Plate 39



A bush of ***Salvadora persica*** (*Arak*), wadis of the Red Sea coast



A flowering branch of ***Salvadora persica***

Plate 40

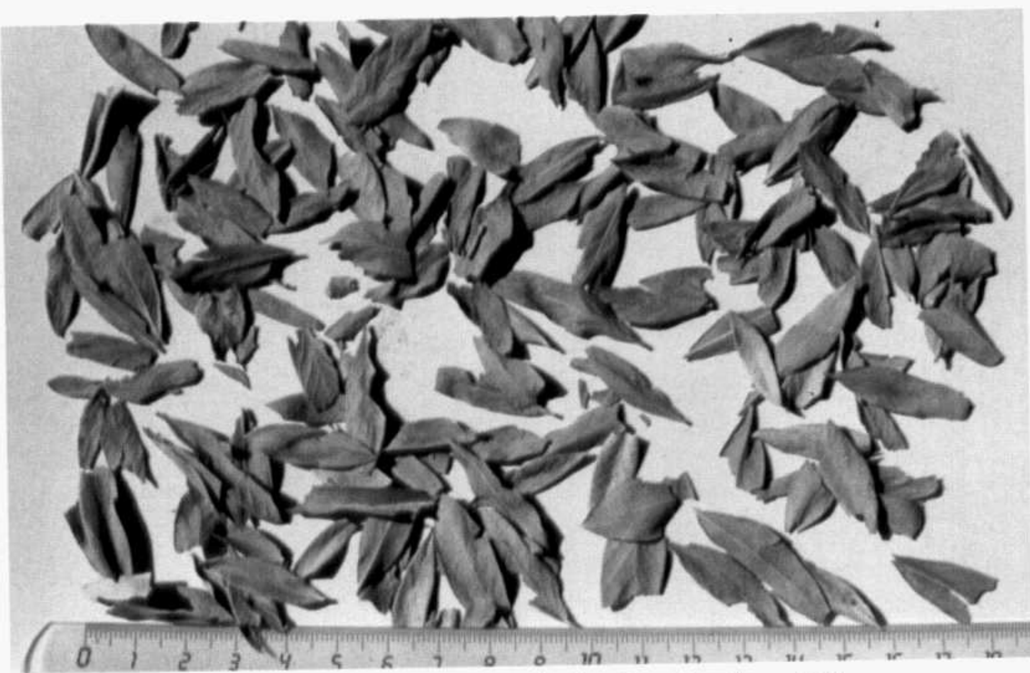


Fruiting branch of ***Solanum nigrum***



Flowering branch of ***Solenostemma arghel*** (*hargal*)

Plate 41

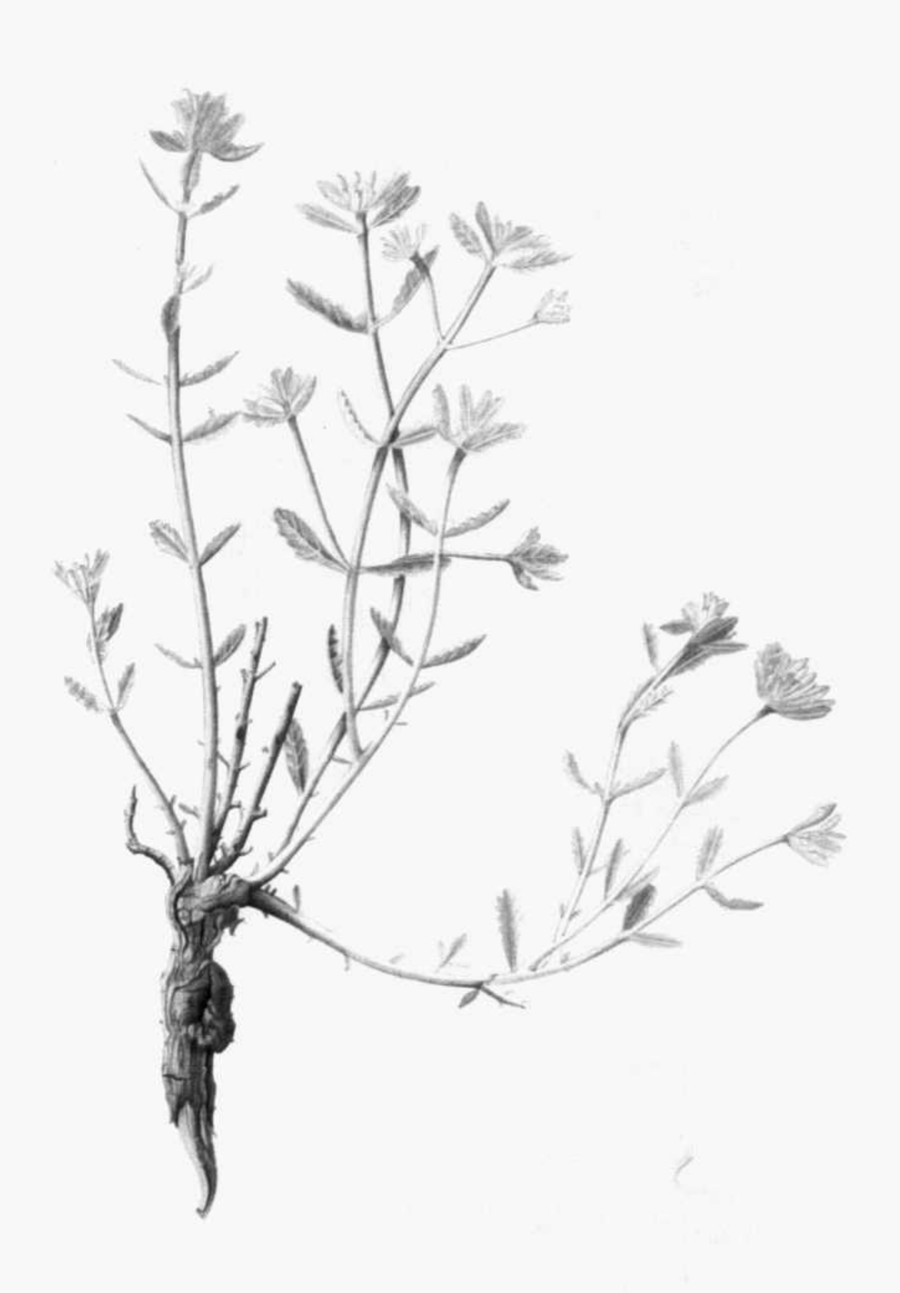


Leaves of ***Solenostemma arghel*** in the *attar* shop, Cairo



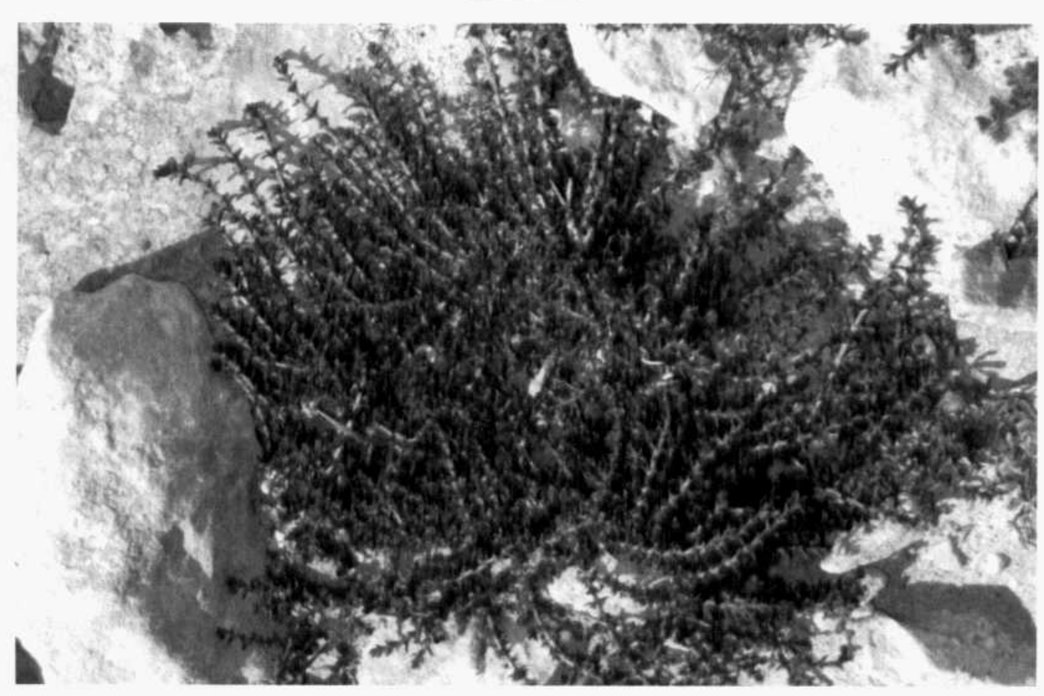
Teucrium polium (*Ja'ada*) growing in a rocky habitats

Plate 42

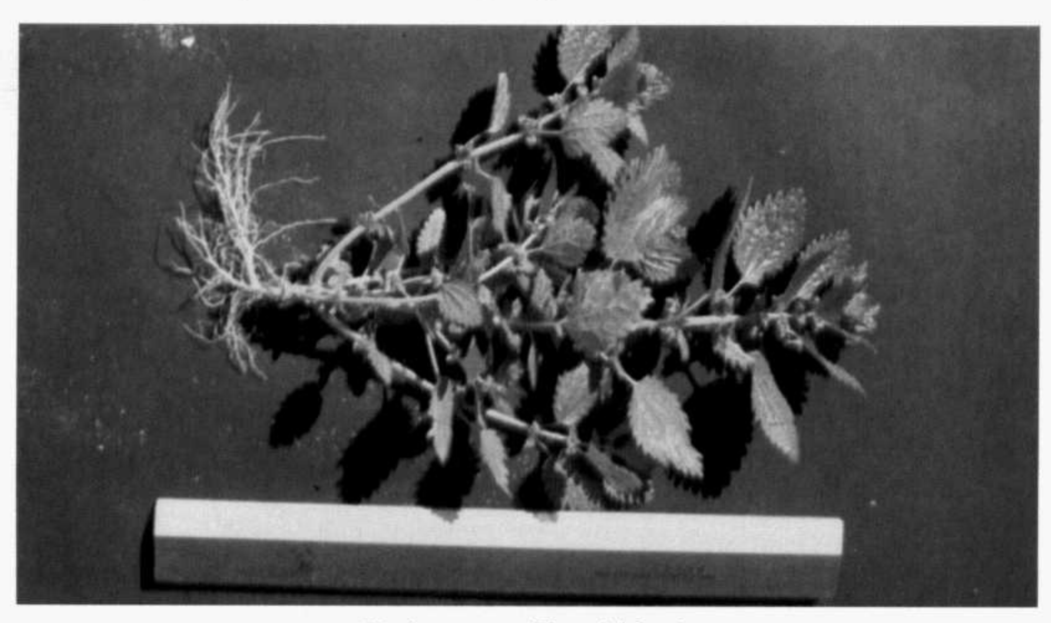


Teucrium polium (*Ja'ada*)

Plate 43

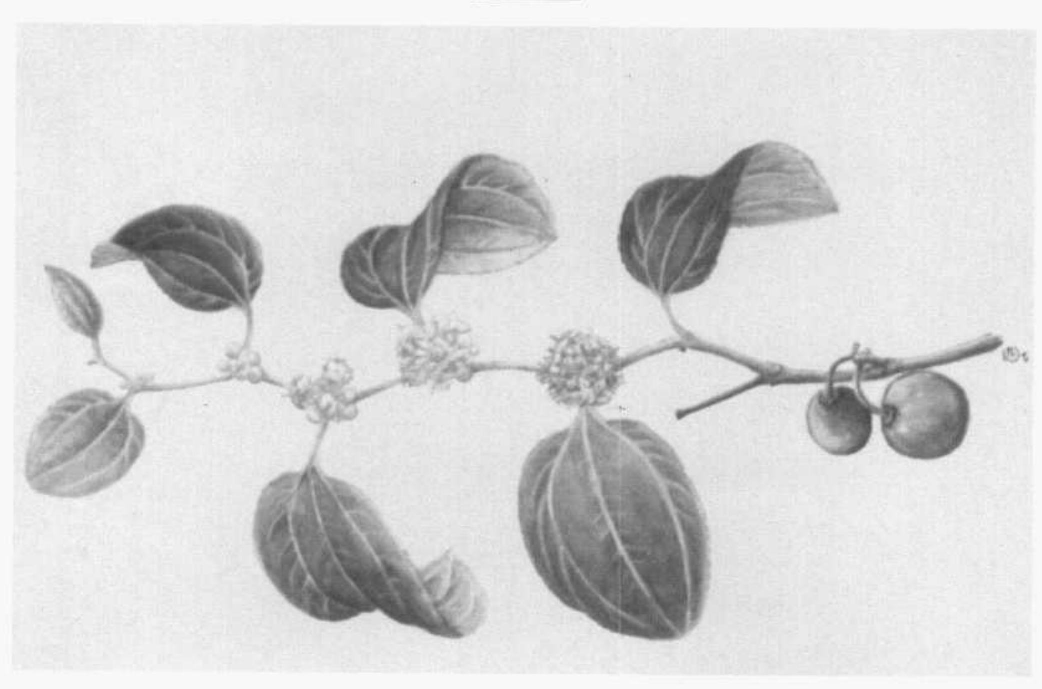


Thymus capitatus on the rocky ridges, Abou Sir, N. W. coastal zone



Urtica urens (*Horreiq*) herb

Plate 44

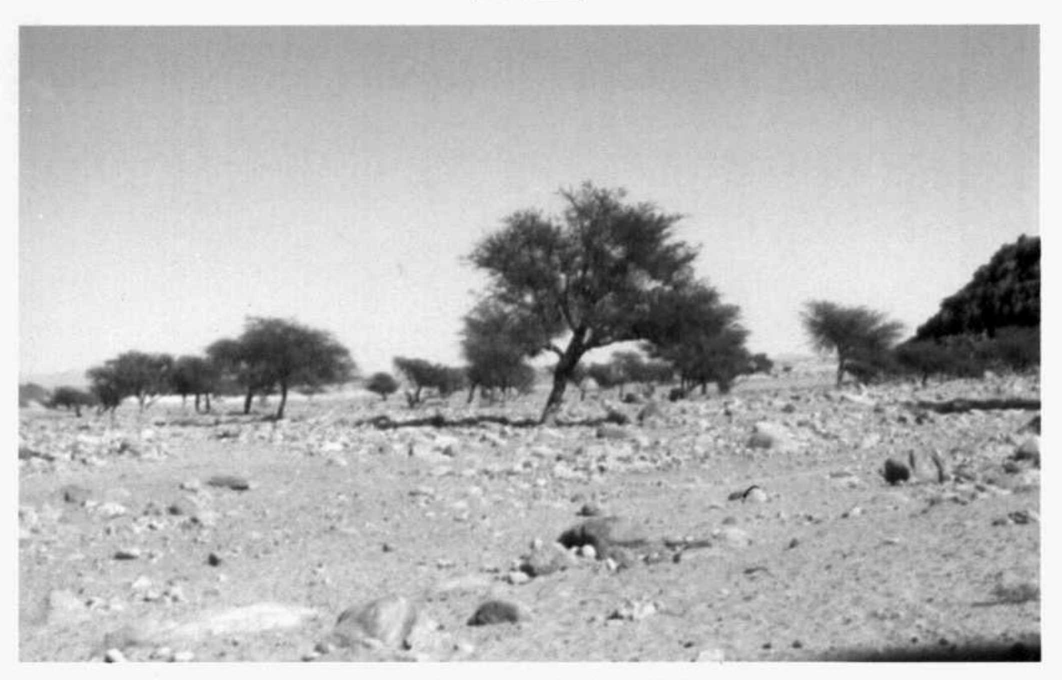


Ziziphus spina-christi (*Nabq*)



A branch of ***Zygophyllum coccineum***

Plate 45

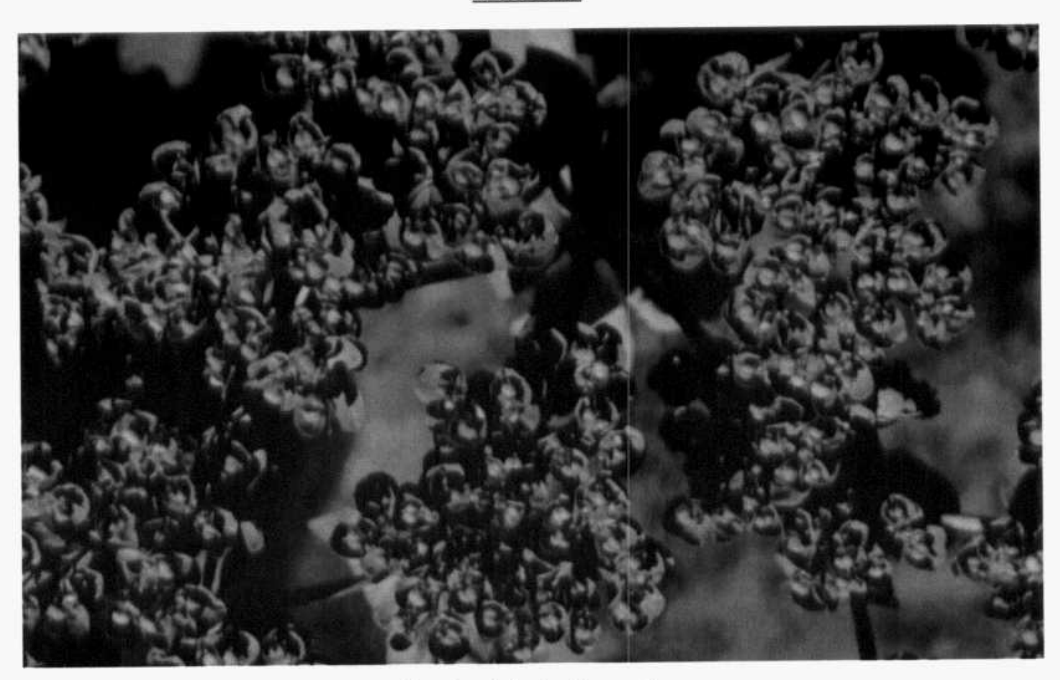


Acacia raddiana, Halaib, S.E. Egypt



Asphodelus fistulosus (*Barwaq*)

Plate 46



Euphorbia heliscopia

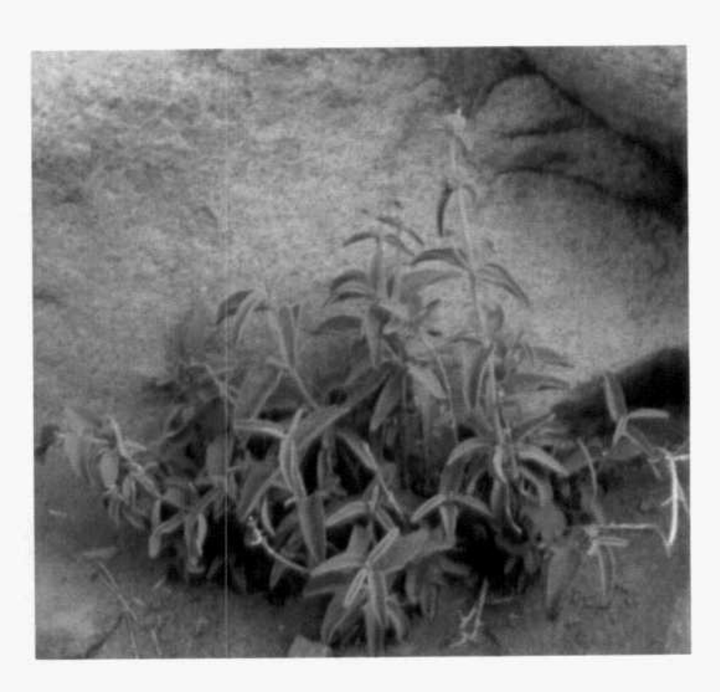


Haplophyllum tuberculatum in the *attar* shop, El Hammam, N. coast

Plate 47



Hyphaene thebaica (*Doom*) fruits, Aswan

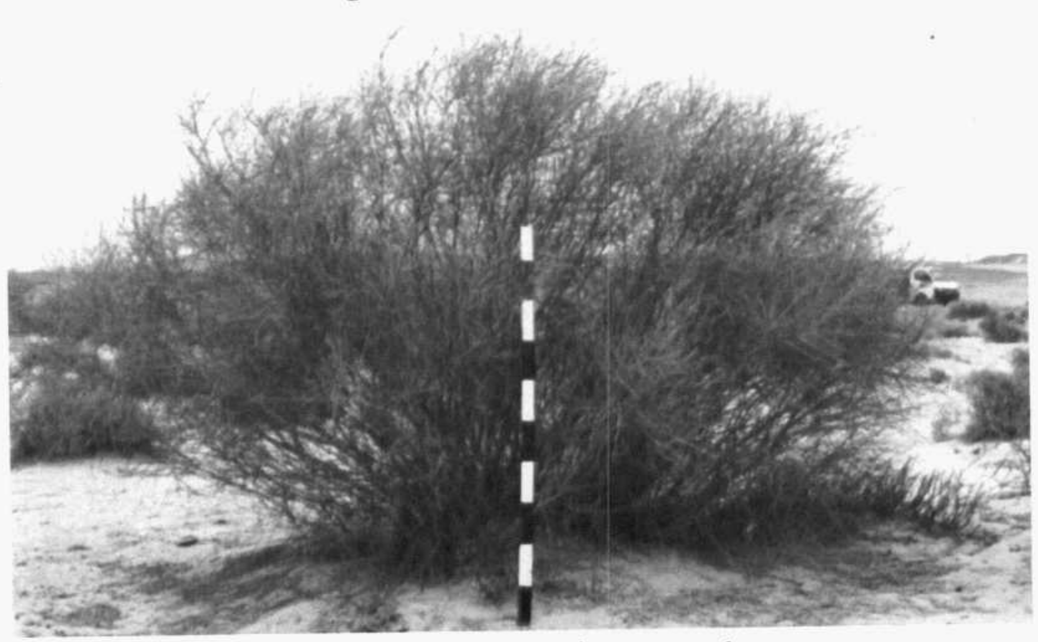


Mentha longifolia, Sinai

Plate 48



Flowering branch of ***Pulicaria*** (*Shay El Gebel*)



Retama reatam shurb in the Eastern desert

APPENDIX

Pharmaceutical Preparations from extracts, active principles from Wild Plants in Egypt

No	Species	Pharmaceutical Product	Company
1	Ammi majus	Meladinine Neomeladinine	Memphis Memphis
2	Ammi visnaga	Khellelgon Khellalgin Glucolynamine Lynamine Khellin Khellalgine	Mepaco Memphis Memphis Memphis Memphis Misr
3	Citrullus colocynthis	No habit lotion	3M Medical
4	Datura stramonium	Buscopan Buscopan Comopositum Buscopan plus Butacid Farcolexain Spasmocin Fortalgine Nospasm	CID (Boehringer Ing) CID Pharco Memmphis Amoun Ebico
5	Glycyrrhiza glabra	Comp.Powder of liquorice Iopnoi syrup Glucophene syrup Meloids pastils Baby drink Seven Herbs	Kahira Kahira Memphis Boots Pharco Misr
6	Hyoscyamus muticus	Avicenne powder Atropine Eye ointment Atropine amp.	Kahira Nile Memphis, Misr
7	Plantago afra (=P. psyllium)	Metamucil	Searl
8	Plantago lanceolata	--	--
9	Plantago ovata	Laxiplant Agiolax Biolax Regime tablets	Schwabe Madaus (CID) Sekem Sekem

10	Senna alexandrina (= Cassia alexandrina)	Sennalax tab Mucinum tab Laxative tea bags Intestinal tea bags Eucarbon	Nile Amiryah Mepaco Sekem Sedico
11	Senna italica (= Cassia itlica)	--	--
12	Silybum marianum	Legalon tab Silymarin granules	CID Sedco
13	Urginea maritima	Scillaren amp. Scillaren tab Palmocadil syrup Cosylan syrup Lobestra syrup Expectyl syrup Broncho cough syrup	Sandoz Sandoz Nile Co P.D. Nile Co Adco Mepaco
14	*Ambrosia maritima* L.	Renal	Sekem

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